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OUTLINES

OF

COSMIC PHILOSOPHY,

BASED ON THE

DOCTRINE OF EVOLUTION,

WITH

CRITICISMS ON THE POSITIVE PHILOSOPHY.

BY

JOHN FISKE, M.A., LL.B.,

ASSISTANT LIBRARIAN, AND FORMERLY LECTURER ON PHILOSOPHY,
AT HARVARD UNIVERSITY.

> "*L'univers, pour qui saurait l'embrasser d'un seul point de vue, ne serait, s'il est permis de le dire, qu'un fait unique et une grande vérité.*"—D'ALEMBERT.

> "**Καὶ τὸ ὅλον τοῦτο διὰ ταῦτα Κόσμον καλοῦσιν, οὐκ ἀκοσμίαν.**"—PLATO.

IN TWO VOLUMES.

10/

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PART II.

SYNTHESIS.

(CONTINUED.)

"Die Thätigkeit des Organismus ist bestimmt durch seine Receptivität und umgekehrt. Weder seine Thätigkeit noch seine Receptivität ist an sich etwas reelles, Realität erlangen beide nur in dieser Wechselbestimmung. Thätigkeit und Receptivität entstehen also zugleich in einem und demselben untheilbaren Moment, und nur dieses Simultaneität von Thätigkeit und Receptivität constituirt das Leben. In den entgegengesetzten Richtungen, die durch diese Entgegensetzung entstehen, liegt das Princip für die Construction aller Lebenserscheinungen."—SCHELLING, *Erster Entwurf.* 1799.

C TER X.

NAT SELECTION.

In that most delightful inted books, the "Conversati of Goethe with Eckerma and Soret," there is an anecdote which shows h distinctly the great m ized the importance of t uestion of the origin The news of the Fren Revolution of July, 1830, had just reached Weimar and set the whole town in commotion. In the course of the afternoon, says Soret, "I went around to Goethe's. 'Now,' exclaimed he to me, as I entered, 'what do you think of this great event? The volcano has come to an eruption; everything is in flames, and we have no longer a transaction with closed doors!' 'Terrible affair,' said I, 'but what could be expected under such outrageous circumstances, and with such a ministry, otherwise than that the whole would end with the expulsion of the royal family?' 'My good friend,' gravely returned Goethe, 'we seem not to understand each other. I am not speaking of those creatures there, but of something quite different. I am speaking of the contest, so important for science, between Cuvier and Geoffroy Saint-Hilaire, which has just come to an open rupture in the French Academy!'" At this unexpected turn of the subject poor Soret knew not what to say, and for some minutes, he tells us, his thoughts were quite at a standstill.

The anecdote well illustrates the immeasurable superiority of Goethe over Comte in prophetic insight into the bearings of the chief scientific question of the immediate future. While Comte was superciliously setting aside the problem of man's origin, as a problem not only insoluble but utterly devoid of philosophic value even if it could be solved, the great German poet and philosopher was welcoming the outbreak of this famous contest on questions of pure morphology, as conducive to the speedy triumph of the development theory, for which he himself had so long been waging battle. But events were hastening that triumph even more rapidly than Goethe could have anticipated. In December 1831, only a few weeks before Goethe was laid in the grave, Mr. Darwin set out upon that voyage around the world, in the course of which he fell in with the facts which suggested his theory of the origin of species. The history of the investigation is a memorable one,—worth noting for the illustration it gives of the habits of a truly scientific mind. On his return to England, in 1837, Mr. Darwin began patiently to collect all kinds of facts which might be of use in the solution of the problem,—"how is organic evolution caused?" It was only after seven years of unremitting labour that he went so far as to commit to manuscript a brief sketch of his general conclusions, of which the main points were communicated to his friends Sir Charles Lyell and Dr. Hooker. A less wise and sober speculator than Mr. Darwin would now at once have rushed into print. A thinker less thoroughly imbued with the true scientific spirit would probably have suffered from not publishing his views, and profiting by the adverse criticisms of contemporary observers. It is a striking illustration of Mr. Darwin's patience and self-restraint that he continued fifteen years longer to work assiduously in testing the weak and strong points of his theory, before presenting it to the public. And it is an equally interesting illustration of his thoroughly scientific temperament that, after so many years of solitary labour, he should have been so little carried away by the fascinations of his own hypothesis as to foresee clearly all the more valid objections which might be urged against it. After a careful perusal of the recent literature of the subject, and especially of the skilful work of Mr. St. George Mivart, it still seems to me that the weightiest objections which have yet been brought to bear on the Darwinian theory are to be found in Chapters VI.—IX. of Mr. Darwin's own work, where they are elaborately and in most cases conclusively answered. To such a marvellous instance of candour, patience, and sobriety, united with the utmost boldness of speculation, the history of science can show but few parallels.

In 1858, a fortunate circumstance caused Mr. Darwin to break his long silence, and to give to the public an exposition of the results of his researches. Mr. Wallace, who had been for several years engaged in studying the natural history of the Malay Archipelago, had arrived at views concerning the origin of species quite similar to Mr. Darwin's, and in 1858 he sent Mr. Darwin an essay on the subject, which in August of the same year was published in the Journal of the Linnæan Society. Sir Charles Lyell and Dr. Hooker now earnestly advised Mr. Darwin to publish his own views; and in 1859 the memorable treatise on the "Origin of Species" was given to the world.

It would, however, be incorrect to rate Mr. Wallace's merits, in the discovery of the law of natural selection, so high as Mr. Darwin's. They do not stand on precisely the same level, like Adams and Leverrier with reference to the discovery of the planet Neptune. Mr Wallace indeed thought out independently all the essential points of the theory and stated it in a way which showed that he understood its wide-reaching importance. But being a much younger man than Mr. Darwin, and having begun the investigation at a much later date, he by no means worked it out so elaborately. Nor is it likely that, with an equal length of time at his command, he could have succeeded in producing a work comparable in scientific calibre to the "Origin of Species." His lately published collection of essays, while showing unusual powers of observation and rare acuteness in the application of his theory to certain special classes of phenomena, nevertheless furnishes convincing proof that in breadth and depth of scientific attainment, as well as in philosophic capacity, he is very far inferior to his great coadjutor. In his preface, indeed, Mr. Wallace hastens to acknowledge, with a modest self-appreciation as rare as it is admirable, and especially rare in such cases, that his strength would have been quite unequal to the task which Mr. Darwin has accomplished.

As Prof. Haeckel somewhere observes, it was quite fortunate for the progress of science that Mr. Darwin received such a stimulus to the publication of his theory; since otherwise he might perhaps have gone on several years longer, observing and experimenting in seclusion. The almost immediate acquiescence of the majority of naturalists in Mr. Darwin's views, shows that in 1859 the scientific world was fully prepared for them. The flimsiness of the special-creation hypothesis was more or less clearly perceived by a large number of biologists, who were only withheld from committing themselves to the derivation theory by the circumstance that no satisfactory explanation of the *process* of development had been propounded. No one had assigned an adequate cause for such a phenomenon as the gradual evolution of a new species; and sundry attempts which had been made in this direction were so obviously futile as to excite both distrust and ridicule. Lamarck, for example, placing an exaggerated stress upon an established law of biology, contended that "desires, by leading to increased actions of motor organs, may induce further development of such organs," and that, consequently, animals may become directly adapted through structural changes to changes in their environment. We shall see, as we continue the discussion, that such directly adaptive changes really take place; but Lamarck ill understood their character, and indeed could not have been expected to understand it, since in his day dynamical biology was in its earliest infancy.[1] By insisting on volition as a chief cause of adaptive change, the illustrious naturalist not only left the causes of vegetable variation unexplained, but even in the zoological department laid open the way for malicious misrepresentations which the uninstructed zeal of theological adversaries has gladly transferred to the account of Mr. Darwin. Some time ago a clergyman in New York, lecturing about Darwinism, sarcastically alluded to "the bear which took to swimming, and so became a whale." Had this worthy person condescended to study the subject about which he thought himself fit to enlighten the public, he would soon have discovered that his funny remark is not even a parody upon any opinion held by Mr. Darwin. In so far as it is applicable to any opinion ever held by a scientific writer, it may perhaps be accepted as a parody, though it be a very far-fetched and feeble one, of the hypothesis of Lamarck.

It is now time to explain what the Darwinian theory is. At the outset we may observe that while it is a common error to speak of Mr. Darwin as if he were the originator of the derivation theory, the opposite error is not infrequently committed of alluding to him as if he had contributed nothing to the establishment of that theory save his doctrine of natural selection. Mr. [illegible] [illegible] [illegible] [illegible] him. In fact, however, Mr. Darwin's merits are [illegible]. He was the first to marshal the arguments from [illegible] embryology, morphology, and distribution, and thus fairly to establish the fact that there has been a derivation of higher forms from lower; and he was also the first to point out the *modus operandi* of the change. The first of these achievements by itself would have entitled him to associate his name with the development theory; though it was only by the second that the triumph of the theory was practically assured. Just as, in astronomy, the heliocentric theory was not regarded as completely established until the forces which it postulated were explained as identical with forces already known, so the development theory possessed comparatively little value as a working hypothesis so long as it still remained doubtful whether there were any known or knowable causes sufficient to have brought about the phenomena which that theory assumed to have taken place. It was by pointing out adequate causes of organic evolution that Mr. Darwin established the development theory upon a thoroughly scientific basis.

---

[1] Lamarck also tried to explain organic development generally, as the continuous manifestation of an [illegible]

As Lyell explained all past geologic phenomena as due to the slow action of the same forces which are still in action over the earth's surface and beneath its crust, so Mr. Darwin, in explaining the evolution of higher from lower forms of life, appeals only to agencies which are still visibly in action. Whether species, in a state of nature, are changing or not at the present time, cannot be determined by direct observation, any more than the motion of the hour-hand of a clock could be detected by gazing at it for one second.[1] The entire period

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[1] "If we imagine mankind to be contemplated by some creature as short-lived as an ephemeron, but possessing intelligence like our own—if we imagine such a being studying men and women, during his few hours of life, and speculating as to the mode in which they came into existence; it is manifest that, reasoning in the usual way, he would suppose each man and woman to have been separately created. No appreciable changes of structure occurring during the few hours over which his observations extended, this being would probably infer that no changes of structure were taking place, or had taken place; and that from the outset, each man and woman had possessed all the characters then visible—had been originally formed with them. This would naturally be the first impression."—Spencer, *Principles of Biology*, vol. i. p. 338.

blood-hound are more than ten times as large as the terrier, and, if found in a state of nature, they would perhaps be classed in distinct genera, like the leopard and panther, whose differences are hardly more striking. Yet the ancestral races from which these dogs have been reared differed but slightly from each other. The different breeds of dogs vary in the number of their toes, teeth, and vertebræ, in the number and disposition of their mammæ, in the shape of their zygomatic arches, and in the position of their occiputs; although dogs have not been selected with reference to these peculiarities, about which uninstructed men neither know nor care, but only with reference to their speed, fleetness, strength, or sagacity. In the case of domestic pigeons, where man has been to a great extent actuated by pure fancy in his selections, the divergences are still more remarkable. All domestic pigeons are descended from a single species of wild pigeon; yet their differences, even in bony structure, in the internal organs, and in mental disposition, are such as characterize distinct genera, and to describe them completely would require a large volume. Pigs, rabbits, cows, fowl, silk-moths, and hive-bees furnish no less instructive evidence; and the development of the peach and the almond from a common stock, and of countless varieties of apple from the sour crab, may be cited, out of a hundred examples, to show what prodigies artificial selection has accomplished in the modification of vegetal organisms.

Now Mr. Darwin's great achievement has been to show that a similar process of selection, going on throughout the organic world without the knowledge or intervention of man, tends not only to maintain but to produce adaptive alterations in plants and animals. The process is a simple one, when once we have the clew to it. All plants and animals tend to increase in a high geometrical ratio. The old problem of the nails in the horse's shoe teaches us what an astounding affair is a geometrical rate of in-

continue at this rate for three or four years, the ocean would not afford room for the species. Yet we have no reason to suppose that the race of codfishes is actually increasing in numbers to any notable extent. With the codfish, as with animal species in general, the numbers during many successive generations oscillate about a point which is fixed, or moves but slowly forward or backward. Instead of a geometrical increase with a ratio of six millions, there is practically no marked increase at all. Now this implies that out of the six million embryo codfish a sufficient number will survive to replace their two parents, and to replace a certain small proportion of those contemporary codfishes who leave no progeny. Perhaps a dozen may suffice for this, perhaps a hundred. The rest of the six million must die. We may thus understand what is meant by the "struggle for existence." Battles far more deadly than those of Gettysburg or Gravelotte have been incessantly waged on every square mile of the earth's life-bearing surface, since life first began. It is only thus that the enormous increase of each species has been kept within bounds. Of the many offspring produced by each plant and animal, save in the case of those highest in the scale, but few attain maturity and leave offspring behind them. The most perish for want of sustenance, or are slain to furnish food for other organisms. There is thus an unceasing struggle for life—a competition for the means of subsistence—going on among all plants and animals. In this struggle by far the greater number succumb without leaving offspring, but a few favoured ones in each generation survive and propagate to their offspring the qualities by virtue of which they have survived.

Thus we see what is meant by "Natural Selection." The organisms which survive and propagate their kind are those which are best adapted to the conditions in which they live; so that we may, by a legitimate use of metaphor, personify Nature as a mighty breeder, selecting from each generation those individuals which are fleetest, strongest, most sagacious, lions with supplest muscles, moths with longest antennæ, mollusks with hardest shells, wolves with keenest scent, bees with surest instinct, flowers with sweetest nectar,—until, in the course of untold ages, the numberless varieties of organic life have been produced by the same process of which man now takes advantage in order to produce variations to suit his own caprices.

Between natural selection and selection by man there is, however, one important difference. Selection by man tends to produce varieties adapted to satisfy human necessities or inclinations, and it has no direct reference to the maintenance of the species. Such abnormities as the pouter and tumbler pigeons could not be sustained in a state of nature; and hence, when domesticated animals are turned loose, they are apt to revert to something like their ancestral type,[1] else they are exterminated by races better adapted to wild life. But natural selection, working with the sternest of methods, saves from the general slaughter only those individuals which can best take care of themselves, and thus maintains each species in adaptation to its environment. The wonderful harmonies in the organic world, which a crude philosophy explained as the achievement of creative contrivance, are therefore due to the continued survival of the fittest and the continued slaughter of the less adapted plants and animals.

Now if the geography and meteorology of the earth were ever-constant, if the nature of the soil, the amount of moisture, the density of the atmosphere, and the intensity of solar radiance were everywhere to remain forever unaltered, and if each race of plants and animals were always to remain confined to one limited area, the survival of the fittest would simply maintain unaltered any given aspect of the beings constituting the organic world. All variations on either side of the well-adjusted mean would be incessantly cut off by natural selection, and species would be immutable. It is needless to say that no such state of things has ever existed. Constant change has been the order of things ever since our planet first became fit to support organic life. No part of the earth's surface is now, or ever has been, at rest. Continents are rising and sinking, seas are growing deeper and shallower, soils are constantly altering in chemical composition, rivers are ever changing their beds, solar radiance is ever gaining or losing in intensity, according to the earth's ever-varying position in space, the density and moisture of the air are continually increasing and diminishing, and every species of plant and animal is continually pressing upon the limits of the area within which it is confined. All these changes are going on to-day, and have been going on during millions of ages. Though so slight as to be recognized only by the most careful observation during the period covered by human history, these changes have during longer periods sufficed to submerge every continent and perhaps to make dry land of every sea and ocean on the face of the globe. They have raised mountains like the Andes and the Himalayas at the rate of a few inches per century; they have converted extensive tropical swamps into the desert of Sahara; they have repeatedly covered Europe and North America with glaciers; and they have hidden beneath solid rocks vast treasures of carbon stealthily purloined from the dense atmosphere of an older age.

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[1] This fact, which has often been alleged by superficial critics as an obstacle to the Darwinian theory, is thus in reality implied by that theory.

Since such changes have ever been going on, it follows that organisms have been unable to remain constant and live. A race of animals or plants in which no individuals ever varied would sooner or later inevitably be exterminated, leaving no progeny to fill its place. Observation shows, however, that there is no such race. The members of each species are ever slightly varying, but, so long as the environment remains constant, natural selection prevents the variations from

accumulating [illegible]
advantageous [illegible]
if certain [illegible]
tend to [illegible]
adaptation [illegible]
survive [illegible]
of the species [illegible]
just the same [illegible]
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renders a [illegible]
immigrant [illegible]
antelopes [illegible]
the [illegible]
foetus [illegible]
in the [illegible]
structure [illegible]
adv[illegible]
[illegible]

aided and emphasized by other changes indirectly produced by correlation of growth, and also by what is called the law of use and disuse. By correlation of growth, or internal equilibration, we mean the effect produced upon any part of the organism by change in a related or neighbouring part. Let us suppose that it becomes advantageous to some feline animal, like the ancestor of the lion, to have large and powerful jaws. Since no two of our leonines would have jaws of exactly the same size and strength, natural selection would preserve all the strong-jawed individuals, while the weak-jawed individuals would succumb in the struggle for life. In the course of many generations our race of leonines would possess on the average much larger and stronger jaws than at the period at which we began to consider it. But greater weight of jaw entails increased exertion of the muscles which move the jaw, so that these muscles, receiving more and more blood, will become permanently increased in size and power. The portions of the skull into which the jaw-bones fit will likewise receive an extra strain, and will consequently increase in rate of nutrition and grow to a larger size, so that the shape of the whole head will be altered. This increased weight of the head, and the increasingly violent activity of the muscles which move the jaws, entails a greater strain upon the vertebræ which support the head, and upon the cervical muscles which move it from side to side. The heightened nutrition of these bones and muscles will add to their weight, so that the shoulders and chest will be affected. There will be a tightening of the tendons, and probably a perceptible alteration in the relative lengths of the different bones and muscles throughout the anterior part of the body; and these changes, altering the animal's centre of gravity, will inevitably cause other compensating changes in the rest of the body. The legs, shoulders and haunches will be modified. Alterations in the weights bearing upon the chest will affect the growth of the lungs and the aeration

would become so thoroughly altered as to constitute a distinct species from their graceful, swift, and timid ancestors. It is in just these ways that New Zealand birds, freed by insular isolation from the attacks of mammalian enemies, have grown large and clumsy, and have lost the power of flight which their partly-aborted wings show that they once possessed.

By the same kind of illustration we may form a rough notion of the way in which a single species bifurcates into two well-defined species. Suppose a race of ruminants to have been living in Africa before the introduction of carnivora, and suppose that, for sundry reasons, the vitality of the race was but little affected by moderate variations in the sizes of its individuals, so that while some were comparatively light and nimble, others were comparatively large and clumsy. Now introducing upon the scene the common ancestor of the lion and the leopard—by immigration either from Asia or from some other adjacent territory now submerged—let us note some probable features of the complex result. First, as regards the attacked ruminants, it is likely that in course of time the lightest and swiftest individuals, habitually taking refuge in flight, would have greatly increased both in fleetness and in timidity; the largest and most clumsy of the species, unable to save themselves by fleeing, would often be forced to stand and fight for their lives, and would thus ultimately have gained in size, strength, and courage; while those who were neither nimble enough to get out of the way nor strong enough to fight successfully would have all been killed off. And thus, after a while, by perpetual destruction of the means and preservation of the extremes, we should get two kinds of ruminant as different from one another as the antelope which escapes by his fleetness and cautious timidity, and the buffalo which boldly withstands the lion and not unfrequently conquers or repulses him. Secondly, let us observe what must have been going on all the while with the attacking carnivora. The lighter and less powerful of these would find manifest advantage in crouching amid dense foliage and springing down upon unwary victims passing below. The larger and more powerful individuals would more frequently roam about the open country, attacking the larger ruminants and giving chase to the nimbler ones, and would thus increase in strength and fleetness. And thus there would be initiated such differences of size and habit as characterize the leopard and the lion.

It must be borne in mind that this is a purely hypothetical illustration, which does not pretend to give a complete account of the complex process. I have no idea that the differentiation between antelopes and buffaloes, or between lions and leopards, was accomplished in any such straightforward way as this. But while unduly simplifying the case, the illustration is undoubtedly sound in principle. No doubt the lion is so strong and so swift because only the strongest and swiftest lions have been able to prey at once upon buffaloes and upon antelopes. No doubt the antelope is so swift and so timid because only the swiftest and most quickly-frightened antelopes have been enabled to get away from the lion, and to propagate their kind. And no doubt in the process above described, we get a partial glimpse of some of the essential incidents in the past careers of these races.

All the foregoing illustrations unite in enforcing the conclusion that the direct and indirect effects of natural selection are by no means limited to slight or superficial changes in organisms. The student of physiology well knows that no change, however seemingly trivial, which ensures the survival of the organism in its fierce struggle for existence, can fail in the long run to entail so many other changes as to modify, more or less perceptibly, the entire structure. [illegible] such a slight change as an increased thickness of the [illegible] coat of a mammal may, by altering the [illegible] power of the skin, affect the functions of the lungs, [illegible] and thus indirectly increase or [illegible] animal, which in turn will modify its speed, its muscular development, its mental faculties, and its habits of life.

Having thus briefly indicated the capacity of the theory of natural selection for explaining the most general phenomena of organic variation, let us in conclusion observe how admirably it explains certain special phenomena, which do not otherwise admit of scientific explanation. For evidence of the signal success with which Mr. Darwin has explained such otherwise unaccountable facts as the dimorphism of certain flowers, the existence of neuters or sterile females among bees and ants, the odoriferous glands in mammals, the calcareous shells of mollusks, the heavy carapace of the tortoise, the humps of the camel, the amazingly complicated contrivances through which orchidaceous plants are fertilized by insects, the slave-making instinct of certain ants, the horns of male ruminants, and countless other phenomena; for all this, I must refer to Mr. Darwin's various works. From the mass of phenomena to which the theory of natural selection has been satisfactorily applied, I will only select as an illustration the case of colour, in the animal and vegetal kingdoms.

Until after the publication of Mr. Darwin's speculations, the colours of plants and animals had never been made the subject of careful and philosophical study. So far as any hypothesis was held concerning these phenomena, it was the vaguely conceived hypothesis that they are due to the direct action of such physical conditions as climate, soil, or food. But there are fatal objections to such an explanation. When Dr. Forbes Winslow, in his work on the "Physiological Influence of Light," tells us that "the white colour of animals inhabiting the polar regions is attributable to the absence of intense sunlight," it is an obvious objection that the polar regions are not pre-eminent for darkness. Though within the limits of the arctic circle the sun is below the horizon for six months together, it is none the less for the

bear is white, as the California bear is grey and the Hindustan bear black, because with a coat thus coloured it can best escape notice and secure its prey. The polar hare has a permanent coat of white; but the alpine hare, the arctic fox, and the ermine, which do not live amid perpetual snow, have coats that are white in the winter only. Arctic owls, falcons, and buntings are coloured snowy white; and the ptarmigan is white in winter, while "its summer plumage so exactly harmonizes with the lichen-covered stones among which it delights to sit, that a person may walk through a flock of them without seeing a single bird." In the sandy deserts of Northern Africa, all birds, without exception, all snakes and lizards, and all the smaller mammals, are of a uniform sandy colour. The camel is tinted like the desert in which he lives, and the same is true of the antelope and the Australian kangaroo. The tawny lion, says Mr. Wallace, "is a typical example of this, and must be almost invisible when crouched upon the sand or among desert rocks and stones." His brother, the tiger, "is a jungle animal, and hides himself among tufts of grass or of bamboos, and in these positions the vertical stripes with which his body is adorned must so assimilate with the vertical stems of the bamboo, as to assist greatly in concealing him from his approaching prey. How remarkable it is that besides the lion and tiger, almost all the other large cats are arboreal in their habits, and almost all have ocellated or spotted skins, which must certainly tend to blend them with the background of foliage; while the one exception, the puma, has an ashy brown uniform fur, and has the habit of clinging so closely to a limb of a tree, while waiting for his prey to pass beneath, as to be hardly distinguishable from the bark."[1] Such nocturnal animals as owls, goat-suckers, mice, bats, and moles are dusky-coloured. In tropical forests, where the trees are laden with green foliage all the year round, we find brilliant green of colouring could be regarded as circumstances of importance,—which they cannot.

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[1] Wallace, *Natural Selection*, pp. 49, 52.

Since, therefore, it is natural selection which keeps u protective hues of animals, by killing off all save the conspicuous individuals, we may understand why it is animals which have for several generations been domestic no longer retain, without considerable deviation, their tective style of colouring. Freed from the exigencies of w life, there is no longer an imperious need for concealm and hence the unfavourably coloured individuals survive l the rest, and variety appears among members of the sa species. In the cat family, which appears to have b originally arboreal, there is a strong tendency to the produ tion of stripes and spots. In the lion, which is not arborea and in the puma, owing to the peculiarity above mentione these variegated markings have been almost wholly weede out by natural selection.[1] But in the domestic cat, alon with these spots and stripes which occasionally show it blood-relationship with the leopard and tiger, we more often meet with colours not paralleled among the wild species; now and then we see cats which are coal-black or snowy white. Cows, horses, sheep, dogs, and fowl, furnish parallel examples. Thus too we may understand why the sable and the Canadian woodchuck retain their brown fur during the winter; for the one can subsist on berries, and is far more agile than any of its foes, while the other lives in burrows by the riverside and catches small fish that swim by in the water. And thus we may understand why it is that in the case of birds which build open nests, the female is dull coloured like the nest; while on the other hand, the females of birds which build domed nests are often as brightly coloured as the males.

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[1] The variegated marking usually appears, however, in lion-cubs; thus showing that the variegated colouring of the leopard and tiger is relatively primary, while the monotonous colouring of the adult lion is relatively secondary.

and ground-beetles emit a disagreeable, pungent smell, and they are often conspicuously coloured. But the most wonderful of all are the cases of protective mimicry. The heliconidæ are among the most beautiful of South American butterflies. Being never eaten by birds, on account of a nauseous liquid which exudes from them when touched, they are not only very lazy flyers, but have the under sides of their wings as gorgeously tinted as the upper side, so that they can be seen from quite a long distance. From the same cause they are prodigiously numerous, swarming in all the tropical forests. Now it is obvious that if another butterfly, not protected by a disagreeable odour or taste, were to resemble the heliconia in colouring, it would be as efficiently protected as by imitating a dead leaf or dry twig; provided that there were but few of these butterflies among a large number of heliconias. For, as Mr. Wallace says, "if the birds could not distinguish the two kinds externally, and there were on the average only one eatable among fifty uneatable, they would soon give up seeking for the eatable ones, even if they knew them to exist." Now along with the heliconidæ there does, in fact, live a distinct family of butterflies, the pieridæ, most of which are white, and which are anatomically as distinct from the heliconidæ as a lion from a buffalo. But of these pieridæ there is one genus, the leptalis, which exactly resembles the heliconias in external appearance. So close is the resemblance that such expert naturalists as Mr. Bates and Mr. Wallace have been repeatedly deceived by it at the time of capture. Moreover, each species of this genus leptalis is a copy of the particular species of heliconia which lives in the same district. Every band and spot and fleck of colour in the heliconia is accurately reproduced in the leptalis; and besides this, the lazy mode of flight is also imitated. While in point of numbers, we find about one leptalis to a thousand heliconias. Nor is this the only instance. So pre-eminently favoured are these beautiful of the elaborate observations which have clusions. Without feeling it necessary validity of all the special explanations work, we must admit that the general the by a superabundance of inductive eviden kind of selection is taken in connection protective concealment, we have the mea far the greater part of the colouring fo kingdom.

The colours of the vegetal kingdom ha extent, been no less satisfactorily expl not often need protection, but very oft insects to fertilize them, and maintain powers in the greatest vigour. Their insects, as do also their sweet odours and and that this is the main function of shown by the striking fact that those p perfectly fertilized by the wind, and do insects, rarely or never have gaily-colour

Returning for one moment to the cas are usually benefited by concealment conspicuousness, let us note Prof. Shaler tion of the rattlesnake's rattle. The appendage has long been a puzzle to philo and Darwinians have been repeatedly ch for the formation or preservation by natu organ assumed to be injurious to the speci has lain in the assumption, too hastily made, of the rattle must be prejudicial to the warning its enemies or prey of its pres giving the enemies time for sudden attack, the prey to escape. On the theory of natural preservation of the species must entail the a an organ, or, rather, must prevent its originati

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[1] Wallace, *Natural Selection*, p. 262.

so that in a fierce struggle it will often happen that its action is not prompt enough to preclude a return of compliments fatal to the snake. When a tiger tears open the jugular vein of his enemy, the enemy is placed *hors de combat* at once; but when the rattlesnake has bitten, there is nothing to prevent the foe from employing his few remaining moments in tearing the serpent to pieces. Hence the rattlesnake must be peculiarly benefited by an apparatus which serves as a signal to warn enemies of his presence, and to keep them from attacking him. His more formidable enemies, belonging chiefly to the mammalian class, are certainly intelligent enough to profit by such warning and shun the danger; and as it is plainly for the snake's advantage to avoid even a conflict, it is clear that he is practically helped even less by his terrible bite than by his power of threatening a bite.

This explanation seems to me quite sound in principle. Yet if we adopt it, there is nothing to prevent us from giving due weight also to Prof. Shaler's suggestion. The success with which the note of the cicada is counterfeited by the rattle is a point to be more fully determined by further observation. And if it turns out that the rattle fulfils the double purpose of alarming sundry animals that are hostile and of enticing sundry others that are good for food, it will not be the first case in which it has happened that a structure useful in one way has also become useful in another way. The question is an interesting one, and valuable if only because it reminds us of the danger of reasoning too confidently, from *à priori* premises, about matters the due elucidation of which requires careful study of the details of the every-day life of animals. It is one of the great merits of the theory of natural selection that it has directed so many naturalists, with eyes open, into this fruitful field of inquiry.

It is because it so well illustrates the wealth of suggestiveness in Mr. Darwin's theory, that I have ventured upon t

CHAPTER XI.

TWO OBJECTIONS CONSIDERED.

When an objection to a complex theory in any
of science is so extremely obvious as to seem a
fatal to the theory, it is unwise to urge it in argu
we have very thoroughly considered the matter.
Laplace and Goethe, Spencer and Darwin, in fra
theories of evolution, are indeed liable to overlook d
which are so unobtrusive as to be detected only
longed observation; but they are very unlikely to
difficulties which are so conspicuous as to occur at
the minds of a hundred general readers. When, then
reader of average culture, who has perhaps never so
bent his mind to the question of the origin of specie
who is very likely unacquainted with the sciences
throw light upon that subject, finds himself immedi
confronted by difficulties in a theory which men of
highest learning and capacity have spent a quarter of a ce
tury in testing, common prudence should lead him to con-
tinue his study until he has made sure that the difficulty i
not due to his own ignorance rather than to the shortcomings
of the theory. This wholesome caution is too seldom mani-
fested by literary reviewers, many of whom, in criticizing
Mr. Darwin's theory without having duly read his works

guistic differentiation. It is held by most philologists that all languages in the tertiary or amalgamative stage of development must have previously existed in the secondary or agglutinative stage,—and, at a yet earlier period, in the primary or juxtapositive stage, of which the Chinese is a still living example. Against this view M. Renan has urged the absence or paucity of transitional forms connecting one class of languages with another. Now in answering M. Renan's objection, I have begun by showing, from a consideration of the Romanic dialects, that the difficulty is only imaginary. "A language like Latin, spread over a vast space of country in imperfectly civilized times, inevitably breaks up into a host of local *patois*. Each secluded rustic community has its own style of pronunciation, its own choice of words and syntactical devices, its own method of contracting or otherwise modifying its expressions. And although the inhabitants of any given town can usually communicate with those of the next town, the slight differences accumulate until intercourse between distant places is no longer practicable. In such a state of things we find plenty of transitional dialects, as the Genoese and Provençal between Italian and French, and the Balearic and Catalan between French and Spanish. The Tuscan can understand the Genoese, the Genoese can understand the dweller in Piedmont, the Piedmontese can understand the Vaudois, the Vaudois can understand the Lyonnais, and so on until we come to Paris; but the Tuscan and the Parisian cannot understand each other. Now the progress of civilization in each country tends to kill out the *patois*, elevating that variety of the language which has been made the vehicle of the dominant literature to supremacy over the more provincial forms. Increased facilities of communication, and the growth of large centres of population, and commercial as well as literary activity, end by making the inhabitants of all parts of the country speak and write

where driven before it its great congener. In A
imported hive-bee is rapidly exterminating the
less native bee. One species of charlock has
to supplant another species; and so in other case
dimly see why the competition should be
between allied forms, which fill nearly the same
the economy of nature; but probably in no one
we precisely say why one species has been victo
another in the great battle of life."[1]

For our present purpose, however, it is not
we should be able to accomplish the latter task, wh
require a knowledge of the minutiæ of the orga
such as is not likely to be possessed by anyone
time to come. It is enough for us to note that the
process of competition, among organisms as among
tends to kill out the means much sooner than the
Still more clear will this become, if we recur to
hypothetical illustrations given in the preceding
It was there shown that, in the case of a group of ru
hitherto isolated from carnivorous foes, and in which
strains or varieties have begun to establish themse
newly-arriving incident force, in the shape of stro
swift carnivora, will at once tend to exterminate
intermediate forms, while the extremes will not
indefinitely preserved, but will become yet more
different from each other. Now this hypothetical
probably a fair sample of a very large proportion—per
the majority—of the cases in which specific variations
been rapidly accumulated and persistently fixed. It is
no means likely that variation has gone on throughout
past with a uniform pace; but there must rather have
immensely long periods of comparative stability, alternating with relatively brief periods, during which newly-introduced sets of circumstances have tended to enhance

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[1] *Origin of Species*, 6th edit., p. 59.

defined species which propagate themselves through ages with relative stability of character, the number of mediate individuals which ever come into existence m relatively small. We have next to note that, even of relatively small number of individuals, a still smaller tive number are likely to leave after death a permanent record of their existence.

In the first place it is only by a rare combination of cumstances that any plant or animal gets fossilized at The chances were nearly infinite against the preservation any of the very earliest organisms, with their soft and spe decaying textures. The higher land animals, on the o hand, owe their occasional preservation to the accident dying in sheltered caves, or of being covered with bl sand or peat-moss, or of being frozen in Arctic ice. T with solid trunks, littoral and marine animals, especi crustaceans and shell-covered mollusks, are more likely to preserved than other organisms. But, in the second pl the majority of the organisms once fossilized are afterwa destroyed along with the sedimentary strata which cont them. Since there have been several enormously long al nating periods of elevation and of subsidence, it follows t all the older sedimentary strata must have been metam phosed by volcanic heat. These oldest rocks have sunk t depth of six or eight miles, down below the ocean-fl where they have been metamorphosed by the heat of molten liquid below, and whence they have again been slo shoved up above water-level, with all traces of their orga contents obliterated. This process must have occurred many times as to have destroyed all but the later record life. The title "palæozoic," formerly applied to the Silu rocks, is a misnomer. It was formerly supposed that th were no fossil-bearing rocks below the Silurian. But wit a few years the Cambrian and Laurentian strata have b discovered, carrying us back into an antiquity nearl elevation when archipelagos are being converted into continents, and when shallow parts of the sea, hitherto divided by deep channels, are getting practically united together by the diminishing depth of the channel. During such periods it is not only the inorganic agencies of climate and soil which will be altered; the organic environment of each group of organisms will be immensely increased in extent and heterogeneity. The struggle for existence will increase in violence, and there will be an increased amount both of variation and of extinction.

We are thus driven to the remarkable conclusion, not only that each system of fossiliferous strata now remaining has been preceded and followed by systems destroyed as fast as they were formed, but also that the systems thus destroyed coincided with the periods which must have been richest in transitional forms.

But notwithstanding the extreme imperfection of the geological record, and notwithstanding these special difficulties in the way of finding transitional forms, such forms are frequently met with. Indeed it may be asserted, as one of the most significant truths of palæontology, that extinct forms are almost always intercalary between forms now existing. Not only species, genera, and families, but even orders of contemporary animals, apparently quite distinct, are now and then fused together by the discovery of extinct intermediate forms. In Cuvier's time, horse, tapir, pig, and rhinoceros were ranked as a distinct order from cow, sheep, deer, buffalo, and camel. But so many transitional forms have been found in tertiary strata that pachyderms and ruminants are now united in a single order. By numerous connecting links the pig is now seen to be closely united with the camel and the antelope. Similar results relating to the proboscidians, the hyæna family of carnivora, the apes, the horse, and the rhinoceros, have been obtained from the exploration of a single locality near Mount Pentelikos in Greece. Among

single item of positive evidence will always outweigh any amount of negative evidence. A single case in which two or three species or genera are demonstrably connected with each other through lineally intermediate forms, is enough to outweigh the case of a thousand species or genera in which no such linear connection has yet been demonstrated. Now there can be no question that *Equus*, *Hipparion*, and *Anchitherium*, are quite distinct genera; and a comparison of the skeletons of the three leaves it equally unquestionable that the hipparion is simply a more ancient horse, and that the anchitherium is simply a more ancient hipparion. As Prof. Huxley observes, "the process by which *Anchitherium* has been converted into *Equus* is one of specialization, or of more and more complete deviation from what might be called the average form of an ungulate mammal. In the horses, the reduction of some parts of the limbs, together with the special modification of these which are left, is carried to a greater extent than in any other hoofed mammals. The reduction is less and the specialization is less in the hipparion, and still less in the anchitherium; but yet, as compared with other mammals, the reduction and specialization of parts in the anchitherium remain great."[1] But as we gò back still farther into the Eocene epoch, we find *Plagiolophus*, a genus intermediate between the horse and the agouti, in which the reduction and specialization of parts is still less. Here, where the exploration has been relatively complete, the intermediate forms are so numerous as to leave no doubt whatever as to the genetic kinship.[2] And similarly of the rhinocerotidæ and hyænidæ

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[1] *Critiques and Addresses*, p. 195.

[2] I may add that, in particular, numerous extinct forms intercalary between man and ape are likely to be discovered when we search for them in those parts of the earth where they are likely to exist,—namely, in Africa, Madagascar, South-eastern Asia, and the Malay Archipelago. Such forms are not likely, however, to be directly intermediate between man and the gorilla or the chimpanzee. For these are probably aberrant types, and the connection between man and the anthropoid apes is to be sought much lower down,—

Prof. Huxley says, "it is indeed a conceivable (?) supposition that every species of rhinoceros and every species of hyæna, in the long succession of forms between the Miocene and the present species, was separately constructed out of dust, or out of nothing, by supernatural power; but until I receive distinct evidence of the fact, I refuse to run the risk of insulting any sane man by supposing that he seriously holds such a notion."

It thus appears that the argument from "missing links," which to the general reader may appear so obviously fatal to the Darwinian theory, is to the student of palæontology by no means alarming. Our brief survey of the facts in the case has shown us *first*, that transitional varieties are always likely to have been less numerous in individuals than the well-defined species which they serve to connect; *secondly*, that the geologic eras which have left in the rocks the record of their organic life have been usually the eras in which variation and extinction have been least rapid, and in which accordingly transitional varieties have been least numerous; and *thirdly*, that in spite of all these adverse circumstances, transitional forms have already been discovered in considerable numbers, while it is fair to expect that many more will be discovered when by and by we have come to know the earth's surface more intimately.

Of all the objections which have been urged against the theory of natural selection, this objection, from the paucity of transitional forms, is the least weighty, though probably the most obvious. The second objection which we have to consider, though less immediately obvious, is more weighty; and though there is no reason for regarding it as insuperable, we must admit that it has not yet been entirely disposed of. This objection is implicated with the difference

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perhaps near the point of departure of the anthropoid apes from the lower monkeys and lemurs. See the anatomical evidence very well presented in Mr. Mivart's recent work on *Man and Apes*.

between the morphological and the physiological definitions of species, and is usually known as the argument from the infertility of hybrids. As ordinarily stated, indeed, this argument is merely the expression of a sorry confusion of ideas. By a curious misunderstanding the infertility of the mule is often urged as a direct objection to the Darwinian theory. But this is putting the cart before the horse. It is not the infertility of the offspring of the horse and the ass which should be cited as an obstacle to the theory of natural selection, but it is the fertility of the offspring of the carrier-pigeon and the pouter, or of the pouter and tumbler. Morphologically the carrier, the pouter, and the tumbler may well be regarded as distinct species artificially developed from a common wild stock; but so long as mutual infertility is held to be the physiological test by which we are to distinguish between varieties and species, it may be argued that, in spite of their great morphological differences, the carrier and the tumbler are only varieties and not true species. And going a step farther, it may be argued that until the theory of natural selection has accounted for the rise of infertility between races descended from a common stock, it has not completely performed the task of reconciling deduction with observation.

Against the derivation theory in general, this objection has no weight whatever. That races originally fertile together should, after long subjection to different sets of circumstances, become infertile with one another, is *à priori* in the highest degree probable, when we reflect upon the extreme sensitiveness of the reproductive system to changes of habit in the organism as a whole. When we remember that "the constitution of many wild animals is so altered by confinement that they will not breed even with their own females," we need not be surprised that the leopard and the lion, which during many ages have had very different habits of life, will not breed with each other. Nor need we wonder that the horse and the ass, with less importa t differenc general habit, have become partially infertile togethe such an extent that their offspring are hopelessly ba Though the *modus operandi* of this change is as yet understood, it is nevertheless a change quite in harm with what we know concerning the intimate dependence the reproductive system upon the rest of the organism. A let us not fail to note that it is the achievement of this change in the capaciti ' the reproductive system which completes the demarca 1 between two bifurcating species, and finally prevents t indefinite multiplication of intermediate varieties.

But while this obj tion has no weight as against the theory of derivation ir neral, it may fairly be urged that the failure to explain t origination of mutual infertility for the present at lea a shortcoming on the part of theory of natural selec n. After the conclusive argum brought up in our nin chapter, the derivation theory no longer, in the prese work, be regarded as on trial: the higher forms of li e are derived from lower forms, will be taken as proved. But whether the theory of natural selection has completely fulfilled its proposed task of explaining the mode in which such derivation has been brought about, is quite another question. And while admitting the full force of the considerations alleged by Mr. Darwin, in his admirable chapter on Hybridism, it seems to me that there is a gap at this point which further research will be required to fill.[1] As Prof. Huxley reminds us, "it must not be forgotten that the really important fact, so far as the inquiry into the origin of species goes, is that there are such things in nature as groups of animals and of plants, whose members are incapable of fertile union with those of other groups; and that there are such things as hybrids, which are absolutely sterile when crossed with other hybrids. For if such phenomena as these were exhibited by only two of those assemblages of living objects, to which the name of species . . . is given, it would have to be accounted for by any theory of the origin of species, and every theory which could not account for it would be, so far, imperfect."[1]

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[1] I doubt if the hypothesis of natural selection, taken alone, will afford the solution of this problem. It seems more likely that such considerations will have to enter as are presented in Mr. Spencer's *Principles of Biology*, vol. i. pp. 209-291. Concerning what may be called the "dynamics of heredity," we know as yet but little; but as far as speculation has already gone, Mr. Darwin's theory of pangenesis seems to me decidedly inferior to Mr. Spencer's theory of physiological units. I do not discuss these theories here, because it is not necessary for the general purposes of this work. It may do no harm, however, to remind some of my readers that "pangenesis" is merely

We have now reached a point at which we may pause for a moment to contemplate the theory of natural selection in its logical aspect, and to mark its character as a scientific hypothesis. A moment's inspection will reveal the absurdity of the thoughtless remark—sometimes heard from theologians and penny-a-liners—that the Darwinian theory rests upon purely gratuitous assumptions and can never be submitted to verification. On the contrary, the theory of natural selection, when analyzed, will be found to consist of eleven propositions, of which nine are demonstrated truths, the tenth is a corollary from its nine predecessors, and the eleventh is a perfectly legitimate postulate. Let us enumerate these propositions:—

1. More organisms perish than survive;
2. No two individuals are exactly alike;
3. Individual peculiarities are transmissible to offspring;
4. Individuals whose peculiarities bring them into closest adaptation with their environment, are those which survive and transmit their peculiar organizations;
5. The survival of the fittest thus tends to maintain an equilibrium between organisms and their environments;

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a subsidiary hypothesis, with the possible inadequacy of which Mr. Darwin's main theory is in no way concerned.

[1] Huxley, *Lay Sermons*, p. 303.

6. But the environment of every group of organisms is steadily, though slowly, changing;

7. Every group of organisms must accordingly change in average character, under penalty of extinction;

8. Changes due to individual variation are complicated by the law that a change set up in any one part of a highly complex and coherent aggregate, like an organism, initiates changes in other parts;

9. They are further complicated by the law that structures are nourished in proportion to their use;

10. From the foregoing nine propositions, each one of which is indisputably true, it is an inevitable corollary that changes thus set up and complicated must eventually alter the specific character of any given group of organisms;

11. It is postulated that, since the first appearance of life upon the earth's surface, sufficient time has elapsed to have enabled such causes as the foregoing to produce all the specific heterogeneity now witnessed.

It seems to me that this summary fairly represents the logical character of the theory of natural selection. The theory is so strong that no scientific writer is disposed to deny that the process of natural selection has always gone on and must continue to go on. And the inference cannot be avoided that in due course of time the process must work specific variations. The only purely hypothetical portion of the theory is the assumption that past geologic time has been long enough to allow of the total process of evolution by such infinitesimal increments. But concerning this assumption, it is the clear verdict of logic, that if the theory is thoroughly substantiated in all its other portions, we have the right to claim as much time as is needful, provided we do not run counter to conclusions legitimately reached by astronomy, geology, or physics. Now concerning the age of the earth, neither astronomy, nor geology, nor physics, has as yet had anything conclusive to say; and it must be left for future inquiries to give us the quantitative data requisite for settling this point.[1] We cannot yet, indeed, estimate the age of the last great glacial epoch with any approach to accuracy; yet the age which we assign to this epoch must enter as an important factor into our estimates of the antiquity of preceding epochs. But while this point remains undetermined, it may be noted that even the decision which leaves the smallest time for the operation of unaided natural selection can weaken the Darwinian theory only on the assumption that the agency already alleged by that theory has been the sole factor concerned in forwarding organic evolution; and this assumption, though it may have been made by over-confident disciples of Mr. Darwin, has never been made by Mr. Darwin himself. Mr. Darwin is too profoundly scientific in spirit to imagine that, with all his unrivalled patience and sagacity, he has completely solved one of the most intricate problems with which the student of nature has ever been called upon to deal. It is more than likely that future research will disclose other agencies which have cooperated with natural selection in accelerating the diversification of species. Meanwhile the evidence in behalf of the first ten propositions involved in the Darwinian theory is sufficiently strong to make it apparent that a vast amount of specific change must have taken place, and also that natural selection has been a chief factor in producing that change. To the arguments which in our ninth chapter were seen to overthrow the dogma of fixity of species, may now be added the argument that at least one group of clearly-defined agencies is at work, with which, in the long run, the fixity of species must become incompatible. The explanation of the details of specific differentiation may well form the subject of cautious investigation for many generations of observers and thinkers. But enough has already been explained to forth the undeniable Fact of Derivation from the regio mystery in which it was formerly half-hidden, and thus place the Theory of Derivation upon a thoroughly scientific basis. In expounding the way in which this has been done, we have obtained several useful conceptions, which will not fail to do us good service in future chapters.

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[1] The reader who wishes to see how fallacious all attempts at reaching the age of the earth from astronomico-physical arguments are likely to prove with our present resources, may consult Huxley's *Lay Sermons*, pp. 268–279.

CHAPTER XII.

ADJUSTMENT, DIRECT AND INDIRECT.

An objection much less obvious than the two considered in the foregoing chapter, is brought up by Mr. Mivart against the theory of natural selection. In the Cuvierian classification, the marsupials were ranked as an order of mammalia, side by side with orders like the carnivora or rodentia. This arrangement is now obsolete. The class of mammals is no longer directly divided into orders, but is first separated into three sub-classes, the monodelphia, didelphia, and ornithodelphia. The latter sub-class, forming the link between mammals and sauroids, is now nearly extinct, being represented only by a single order, containing two genera, the Australian echidna and duck-bill. Leaving these aside, all other mammals, except the marsupials, are comprised within the sub-class monodelphia. The didelphia or marsupials are divided by Prof. Haeckel into eight orders; and between these orders and sundry orders of the higher monodelphia there is a curious parallelism. For example there is an order of edentate marsupials, there is a marsupial order of carnivora, and another of insectivora, and another of rodents, while the kangaroo strongly resembles the sub-order of ruminants, and the opossum is clearly related to the lemurs, or lowest of the primates. It becomes, then, an interesting problem to settle higher [illegible] so it is difficult [illegible] and the placenta [illegible] independently [illegible] hardly probable. On the [illegible] descend from one [illegible] the differentia[illegible] in the two sub-classes [illegible] of marsupial mice which [illegible] distinguishable from [illegible]

Birds and reptiles [illegible] relation. Upon [illegible] mammals, although [illegible] and reptilian in appearance. [illegible] mammalian sub-class [illegible] a lizard with a [illegible] three classes are diverged [illegible] or batrachian ancestor [illegible] each other much more [illegible] mammals [illegible] super-class of [illegible] when we [illegible] linked [illegible] Birds are divided into [illegible] ent[illegible] a much stronger case has been made out in favour of the descent of the struthious birds from large reptilian forms akin to the dinosauria,—of which extinct order the member most commonly known is the gigantic iguanodon. Now here, says Mr. Mivart, is a dilemma just like the one which confronted us in the case of mammals. If all birds started from the pterodactyl, why do the struthious birds so strongly resemble a totally different reptile? If all birds started from a dinosaurus, why do the carinate birds so strongly resemble the pterodactyl? If we try to split the difference, and say that the carinate birds started from the pterodactyl, while the struthious birds started from the dinosaurus, the difficulty is immensely increased. For then the question arises, how could the struthious and the carinate birds, starting from such different points, have come to resemble each other so strongly?

Mr. Mivart is careful to state that these zoological cross-relations do not constitute an obstacle to the theory of evolution. They are difficulties only on the theory that organic evolution has been solely caused by the natural selection of fortuitous variations. To make this more clear, let us provisionally accept one of each of the pairs of alternatives offered by the two cases just described. Let us agree, with Prof. Haeckel, that all the monodelphian mammals have come from one didelphian; and let us agree, with Prof. Huxley, that the kinship between birds and reptiles is closest in the case of the struthious birds and the dinosaurians. Now we are obliged to maintain that the original monodelphian branched off into a dozen or more forms, of which six or seven happen to agree remarkably, in general appearance and in habits of life, with six or seven of the forms into which the original didelphian had at an earlier date branched off. And we are also obliged to maintain that the remarkable shoulder-structure of the pterodactyl, in which it agrees so closely with the carinate birds, was independently evolved

are linked together only at their lowest extremities, and while the lowest vertebrate has an eye far inferior to the one just described, the molluscoid ascidians have merely rudimentary eye-spots. The coincident structures have therefore been independently developed. Again, Mr. Mivart urges that the agreement cannot be explained on the assumption "that the conditions requisite for effecting vision are so rigid that similar results in all cases must be independently arrived at"; for the eyes of the higher insects, which are excellent visual organs, differ very widely in structure from those of the cuttle-fish and the higher vertebrates. Here, therefore, is a difficulty; and it is still further increased if the alleged fact be true, that there is a similarly close correspondence between the auditory structures in the vertebrates and in the cuttle-fish.

In presenting these difficulties I have closely followed Mr. Mivart, whose scientific arguments are usually stated with a clearness and precision which one would gladly see paralleled in the philosophic discussions by which they are supplemented. I have selected these arguments because they seem to me to constitute the strongest portion of the case which Mr. Mivart has brought to bear against the theory of natural selection; and also because by seeing whither they tend, we shall begin to see how the theory of natural selection must be supplemented, before it can become a complete explanation of the phenomena with which it deals.

Now we must at the outset admit that natural selection must act upon every individual variation which is distinctly advantageous or injurious to the species,—always preserving the former and rejecting the latter. This process must equally go on, whether the variation is a mere idiosyncrasy, such as we call fortuitous, or whether it is one that is manifested simultaneously by a large number of individuals, so that it may be traced to causes acting upon them all in common. Now this latter case is the one which must here be taken into the account. If a large number of individuals may simul-

[illegible]
passed over. In estimating [illegible]
upon a number of variables [illegible]
taken for granted we must [illegible]
[illegible] in connection with [illegible]
may be assignable [illegible]
single generation of organisms [illegible]
[illegible] throughout [illegible]
which are due to the [illegible]
environing circumstances. [illegible]
wrought upon the human [illegible]
physical conditions such [illegible]
[illegible] Within the [illegible]
English have [illegible]
very slightly from the [illegible]
slight difference which [illegible]
a certain [illegible]
which certainly cannot [illegible]
be almost wholly due to [illegible]
and social conditions [illegible]
twenty-five [illegible]
greatest European [illegible]
[illegible]
M. [illegible] has stated [illegible]
of England and France [illegible]
their rate of growth [illegible]

butterflies of Celebes all show parallel divergences, inexplicable by natural selection alone, from kindred species in Java and India. And a host of like facts concerning these insects are cited by Mr. Mivart from Mr. Wallace's essay on the Malayan Papilionidæ. More examples might be cited if this work were intended to be a scientific treatise on Darwinism; but for the comprehension of the present point, in its philosophic bearings, these illustrations will suffice.

Facts of this kind point to the conclusion that an inherent capacity for adaptive changes is possessed by all organisms. And by the phrase "inherent capacity" I do not mean to insinuate the existence of any *occulta vis*, or metaphysical "innate power," of which no scientific account is to be given in terms of matter and motion. An organism is a complex system of forces; even the simplest living patch of protoplasm is a highly complex system, but in the higher organisms the complication of forces is almost infinite, when compared with our limited powers of analysis. Now such a system of forces must, under penalty of overthrow, maintain both its internal equilibrium and its equilibrium with external incident forces. And this double maintenance of equilibrium necessitates a rhythmical redistribution of forces from moment to moment, of which, as was shown in the chapter on rhythm, the result must be continual change. Now the internal equilibration of the forces in the organism with each other, is generalized in the laws of growth, development, and heredity; while the external equilibration of the forces in the organism with environing forces, is generalized in the laws of variation and adaptation. As the result of the former process, all organisms tend to assume certain typical forms, as inevitably as crystals. In the case of the lowest organisms the forms assumed may possibly be due to the operation of chemical polarity similar (though much more involved) to that which gives form to crystals. In all but the lowest organisms the forms assumed are the expression of tendencies natural selection of such variations might well be pronounced incapable—save in very rare instances—of working entirely analogous results in organisms so genetically distinct as monodelphians and didelphians, or as vertebrates and mollusks. In other words, natural selection, acting upon such fortuitous individual variations, would tend to produce indefinitely increasing differentiations in many directions. Such differentiations are to be seen in the amazingly elaborate contrivances for the fertilization of orchids, the explanation of which is one of Mr. Darwin's most brilliant achievements. But when it is admitted that a great number of similar adaptive variations must be simultaneously occurring in the same direction, then it is obvious that the natural selection of such variations may often produce analogous results in different genera and families, or even in different orders, classes, or sub-kingdoms. Mr. Mivart alleges the many resemblances between whales and the ancient ichthyosaurians, as hardly explicable on the theory of the selection of fortuitous variations. But when we recollect that the vertebrate structure of mammals is at the outset homologous with that of reptiles, and that direct adaptation must of itself tend to produce similar variations alike in mammals and in reptiles which pass from a terrestrial into an aquatic environment, the resemblance between a whale and an ichthyosaurus ceases to be an enigma. The superficial resemblance of a whale to a fish is a fact of like nature. And in the case of amphibious carnivora, like the seal, direct adaptation to a partially marine environment has aided in producing fish-like limbs, while it has not interfered with the general likeness of the animal to certain families of land carnivora. So in the case of the pterodactyl as compared with carinate birds, we begin with skeletons constructed on the same plan, and we may expect to find that direct adaptation to the necessities of flight will tend to produce similar modifications of the shoulder-structure. But since, before

[illegible]

But now they [illegible] by their [illegible] difficulty in the [illegible] cause of environment [illegible] brought about a different [illegible] great [illegible] marsupials. That [illegible] should [illegible] in the [illegible] distribution [illegible] kinds of [illegible] them from their [illegible] supposing that [illegible] and [illegible] scattered all over the world.

Pursuing the argument [illegible]

But the only special resemblances which are found to exist, are those between the eyes and the ears. Now these are organs in which such variations as occur must be in a pre-eminent degree directly adaptive. The eye, for example, contains an optical apparatus of which the function is the concentration of rays of light into a focus upon the retina. Such is the function discharged by the lens, and the vitreous and aqueous humours. Now, while the compound eyes of insects show us that this function can be discharged in more than one way, a brief consideration of the optical conditions in the case would show that it can only be accomplished in a few ways. Not only does the passage of the light directly tend to set up molecular rearrangements in the refracting matter which lies before the retina, but out of those rearrangements there are very few which can assist the focalizing process, so that natural selection, in preserving the best-refracting eyes, would have but very few directions in which to act. The anterior membrane might differentiate into a number of converging lenses, as in the higher annulosa, but if such a differentiation did not occur, it is difficult to see how the needful refraction could be secured, save by the differentiation of the successive strata which we call the aqueous, crystalline, and vitreous humours. This may serve to indicate the course of explanation to be taken. The physical conditions for securing very efficient vision being thus limited, and direct adaptation being such an important factor in the process, it does not seem at all strange that two eyes quite similar in structure should be independently produced. A precisely similar argument will apply to the case of the ear. And the force of these considerations is still further increased when we learn from Prof. Gegenbaur that the resemblances between the eyes of vertebrates and the eyes of cuttle-fishes are only superficial analogies, and not fundamental homologies, as Mr. Mivart's very exaggerated statement might lead one to suppose.

when A is sounded on a musical instrument, the A-key within the ear vibrates, and transmits its vibrations to a special filament of the auditory nerve. If this view be correct, we have here a truly marvellous instance of differentiation. But now in what way can this structure have ever been useful to human beings in the struggle for life? Doubtless a considerable power of discriminating sounds is useful to any animal, but of what use can it be to distinguish between A and A-sharp? We may safely conclude, I think, that survival of the fittest has played quite a secondary part in this case. The explanation must be sought in the direct effects wrought by auditory vibrations upon the molecular structure of the cochlear fibres. And it is a system of effects which has not even yet been wrought in its present completeness save among highly civilized people. A savage cannot distinguish the slight variations in pitch by which our ears are delighted. And even among ourselves there are ears which can neither in melody discriminate between the ascending and the descending gamut, nor in harmony distinguish between the mellifluous tonic chord and the harsh inversions of the minor ninth. The defect may be compared to that of colour-blindness, although it is probably more common because the ear has been far less thoroughly trained than the eye. Now when we consider how much can be effected by individual training in enabling a moderately good ear to discriminate between quarters, eighths, and smaller fractions of a tone, and bear in mind that this training must consist in the further differentiation of the sensitive cochlear fibres, we have a strong argument in favour of the production of this wonderful structure by direct adaptation alone.

Concerning the human eye I need only say that in the retina it presents a structure closely analogous to the ear-piano just described. The chief layer of the retina is composed of little rods of nerve-tissue, packed closely together like organ-pipes; and it is probable that each of [illegible] vibrates in unison with a particular ray of light.[1] [illegible] case of extreme differentiation just like that witnessed i [illegible] ear; and substantially the same argument will [illegible] The survival of a primeval savage in the strug [illegible] would certainly depend to a considerable extent on his ab [illegible] to discriminate certain colours as well as outlines by eye, as also upon his ability to recognize the *timbre* or qu [illegible] of certain sounds. But the power of distinguishing [illegible] delicate shades in a painting of Correggio could be no m [illegible] useful, from a zoological point of view, than the power appreciating the most subtle harmonic effects in a symphony of Schumann. For this extreme differentiation there wo [illegible] seem to be no assignable cause save the direct actio [illegible] luminous waves upon the wonderfully sensitive and respo [illegible] nerve-tissue of civilized man.

Were it needful for the further illustration of our pos [illegible] I might show how Mr. Spencer has proved that the str [illegible] of vertebral columns is also primarily due to directly ad [illegible] changes. Many peculiarities in the shapes of plants and animals are probably thus to be explained. And in regard to the hues of organisms—those phenomena which are so beautifully explained by the Darwinian theory—there are some exceptions to be cited. The magnificent tints of many corals, of certain caterpillars, and of the shells of sundry mollusks, must undoubtedly be due to the direct working of such chemical affinities as produce our wonderful aniline dyes, or the rich tints of our American autumn woods.

But passing over all these interesting points enough has been said to show that there are many [illegible] evolution which natural [illegible] will not suffice to account for [illegible] now agreed upon, there may be framed an outline of a tolerably complete classification of agencies. Let us reduce to a common form of expression the agencies contemplated in this and in the two preceding chapters.

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[1] This is the opinion of H [illegible]

Considered in the widest sense, the processes which we have seen to cooperate in the evolution of organisms are all processes of equilibration or adjustment. From the dynamical point of view, as has been shown in previous chapters, an organism is a complex aggregate of matter, in which permanent structural and functional differentiations and integrations are rendered possible by the fact that it continually receives about as much motion as it expends. Now a state in which expended motion is continually supplied from without, is called a state of *dependent moving equilibrium.* In other words, it is a state in which every change in the distribution of external forces must be met by a change in the distribution of internal forces, in order that the equilibrium may be preserved. This is the case with every organism. Its life is a perpetual balancing of external forces by internal forces. And the complete accomplishment of this end requires also that there shall be a continuous internal equilibration,—a perpetual balancing of forces operative in the different parts of the organism. Thus the career of an organism, or of a group of organisms, consists of two kinds of equilibration, which we may briefly designate as external and internal equilibration. And a moment's consideration will show us that each of these kinds of equilibration may be either direct or indirect. The adjustment of a group of organisms to changing external circumstances is effected partly by such direct adaptations as we have above considered, partly by the destruction of all those members of the group which do not become directly adapted. In this latter way equilibrium is maintained indirectly; and natural selection, or survival of the fittest, may be accurately characterized as "indirect equilibration." Turning now to the

which expresses the chief characteristic of organic evolution. We have reached the all-important truth that the progress of life on the globe has been the continuous equilibration of the organism with its environment. We need now only go a step farther in order to obtain a formula which will not only express the distinguishing characteristic of Life itself, but will also serve as an immediate basis for our inquiries into the phenomena of mind and of society.

CHAPTER XIII.

LIFE AS ADJUSTMENT.

ONE of the cardinal propositions of Mr. Spencer's system of philosophy is the definition of Life, first published in 1855, in his "Principles of Psychology," but now transferred to the first volume of his "Principles of Biology." According to Mr. Spencer, the continuous maintenance of an equilibrium between the organism and its environment is the process in which life essentially consists. Life—including also intelligence as the highest known manifestation of life—is the continuous establishment of relations within the organism in correspondence with relations existing or arising in the environment.[1] Out of the host of illustrations by which this formula is justified, it will be sufficient for our present purpose to select but one or two. "The stinging and contractile powers of a polyp's tentacle correspond to the sensitiveness and strength of the creatures serving it for prey. Unless that external change which brings one of these creatures in contact with the tentacle were quickly followed by those internal changes which result in the coiling and drawing up of the tentacle, the polyp would die of inanition. The fundamental processes of integration and disintegration within it would get out of correspondence with the agencies and processes without it; and the life would cease." So in higher animals, "every act of locomotion implies the expenditure of certain internal mechanical forces, adapted in amounts and directions to balance or out-balance certain external ones. The recognition of an object is impossible without a harmony between the changes constituting perception, and particular properties coexisting in the environment. Escape from enemies supposes motions within the organism, related in kind and rapidity to motions without it. Destruction of prey requires a particular combination of subjective actions, fitted in degree and succession to overcome a group of objective ones. And so with those countless automatic processes exemplified in works on animal instinct." And similarly, as will appear still more clearly when we come to treat especially of the evolution of intelligence, "the empirical generalization that guides the farmer in his rotation of crops, serves to bring his actions into concord with certain of the actions going on in plants and soil; and the rational deductions of the educated navigator who calculates his position at sea, constitute a series of mental acts by

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[1] The full definition runs thus:—"Life is the definite combination of heterogeneous changes, both simultaneous and successive, in correspondence with external coexistences and sequences." This is incomparably the most profound and complete definition of Life that has ever been framed; and the chapter in which it is set forth and illustrated would alone entitle Mr. Spencer to a place among the greatest thinkers that have ever lived. The objection has indeed been raised, in metaphysical quarters, that this is a definition, not of Life, but of the circumstances or accidents in which Life is manifested. Concerning this objection, we may content ourselves with [illegible] marks by Mr. Lewes. "Both Life and Mind," says Mr. Lewes, [illegible] "Neither is a substance; neither is a force. [illegible] stance would shock all our ideas [illegible] might with equal propriety [illegible] Vitality [illegible] meant by Vitality, or vital forces [illegible] concretes, it will be seen that a certain process, or group of processes, is condensed into a simple expression, and the final result of this process is [illegible]

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posed from a resultant into an initial condition, the name given to the whole group of phenomena becomes the personification of the phenomena, and the *product* is supposed to have been the *producer*. In lieu of regarding vital actions as the dynamical results of their statical conditions, the actions are personified, and the personification comes to be regarded as indicating something independent of and antecedent to the concrete facts it expresses."—*Problems of Life and Mind*, vol. i. p. 110.

or between opacity and translucence in its environment, with the keen-scented bloodhound, and the far-sighted vulture. And the increase of complexity may be appreciated by comparing the motions respectively gone through by the polyp on the one hand, and by the dog and vulture on the other, while securing and disposing of their prey. In the next chapter it will be shown that the advance from lower to higher forms of life consists in the orderly establishment of relations within the organism, answering to external relations of coexistence and sequence, that are continually more special, more remote in space and in time, and more heterogeneous; until at last we reach civilized man, whose intelligence responds to every variety of external stimulus, whose ordinary needs are supplied by implements of amazing complexity, and whose mental sequences may be determined by circumstances as remote as the Milky Way and as ancient as the birth of the Solar System.

When viewed under this aspect the phenomena of life and of intelligence are so similar that it is difficult to keep them separate in our series of illustrations. As we proceed to treat of psychology, we shall much better appreciate the importance of the truth which I am now expounding. Restricting ourselves here, as far as possible, to physiological illustrations, let us note that in any organism life continues just so long as relations in the environment are balanced by internal relations, and no longer. The difference in result between a jump from a horse-car and a jump from an express train running at full speed, depends simply on the difference in the ability of the contracting muscles to neutralize a small or a large quantity of arrested momentum. The motor energy with which the head is carried forward until it strikes the ground, is exactly the surplus of external force to which the organism has failed to oppose an internal force. If the resulting concussion of the brain is not so great as to induce instant death, but only causes inflammain which process we have seen that life consists, must necessitate both the differentiation of the organism and the integration or definite combination of the changes which constitute its activity. For as the life becomes higher the environment itself increases in heterogeneity as well as in extent. The environment of a fresh-water alga is, as Mr. Spencer remarks, limited to the ditch or pool in which the alga lives. The acaleph borne along on a wave of the sea has a much more homogeneous environment than the caterpillar which crawls over leaves; and the actions by which the caterpillar must "meet the varying effects of gravitation," are far more heterogeneous than the actions of the acaleph. In the case of the higher animals, not only is their environment extremely heterogeneous as consisting to a great extent of adjacent organisms which stand to them in the relations of enemies, competitors, or prey; but it also presents highly coordinated actions on the part of these organisms, which must be met by highly coordinated actions on the part of the former. Thus with the increase of the organism in heterogeneity, definiteness, and coherence, its environment increases in heterogeneity and presents more definite and coherent relations to which the organism must adjust itself. And in this way the heterogeneous, definite, and coherent activity of the organism is again enhanced. The corollary from this group of truths is one which will nearly concern us when we come to treat of the Evolution of Society: it is this,—the greater the amount of progress already made, the more rapidly must progress go on.

not be fair in us to draw the inference for him and then upbraid him with it. This kind of misrepresentation is dear to theologians, and we may contentedly leave them an entire monopoly of it. But worse remains behind. Having condemned psychological analysis as useless, Comte offers us in exchange the ludicrous substitute—Phrenology!

Of all the scientific blunders which Comte ever made, this was beyond question the one which has done most to injure his credit with competent scientific critics. Yet in fairness we must remember that Comte's ignorance of psychology was his weakest point, and that forty years ago, when the anatomy and physiology of the nervous system were in their infancy, the conception of dividing the grey surface of the cerebrum into thirty or more provinces, each the seat of a complex group of mental aptitudes, did not seem so absurd as it does now. In those days even Broussais, a first-class physiologist, adopted some of the leading doctrines of phrenology. Moreover the fundamental conception of Gall—which included the anatomical comparison of all animal brains, in connection with the study of the mental characteristics of animals—was a noble conception; though in working it out he showed himself lamentably ignorant of the plainest rules of induction. The purposes of our inquiry do not render it necessary for me to discuss the merits of a hypothesis which has long since ceased to be of any interest, save as an episode in the early history of physiological psychology. Those who wish to see the question treated critically may be referred to the works of Müller, Valentin, Wagner, Vulpian, Gratiolet, Longet, and especially of Lélut; to the appendix to Hamilton's "Lectures on Metaphysics"; to the chapter on Gall in Mr. Lewes's "History of Philosophy"; and to Mr. Bain's treatise on "The Study of Character."

It is not Comte's acceptance of phrenology, but his denial of psychology, which here concerns us. The former is merely a personal question, bearing upon Comte's scientific com-the total science—parts further specialized by the introduction of additional factors. The astronomy of the solar system is a specialized part of that general astronomy which includes our whole sidereal system; and becomes specialized by taking into account the revolutions and rotations of planets and satellites. Geology is a specialized part of this special astronomy; and becomes specialized by joining with the effects of the earth's molar motions, the effects of continuous decrease in its internal molecular motion, and the effects of the molecular motion radiated from the sun. Biology is a specialized part of geology, dealing with peculiar aggregates of peculiar chemical compounds formed of the earth's superficial elements—aggregates which, while exposed to these same general forces molar and molecular, also exert certain general actions and reactions on one another. And psychology is a specialized part of biology, limited in its application to a higher division of these peculiar aggregates, and occupying itself exclusively with those special actions and reactions which they display, from instant to instant, in their converse with the special objects, animate and inanimate, amid which they move."[1]

This last point is one which requires further illustration. Concisely expressed, it amounts to this—that psychology is distinguished by dealing in a particular way with the relations between the organism and its environment. A few illustrations will render this perfectly intelligible; will show us that mere nervous physiology is not, and never can be, psychology.

Nervous physiology treats of relations subsisting within the organism. It explains how waves of molecular motion, set up in a nerve-centre and transmitted along a nerve-axis, cause contraction in the fibres of a muscle, or secretion in a gland, or molecular rearrangement in the substance of the tissues, or sets up a new molecular undulation in some other

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[1] Spencer, *Principles of Psychology*, vol. i. pp. 137, 138.

explained by symbols. Suppose that A and B are two related manifestations in the environment—say, the colour and taste of a fruit; then, so long as we contemplate their relation by itself, or as associated with other external phenomena, we are occupied with a portion of physical science. Now suppose that X and Y are the sensations produced in the organism by this peculiar light which the fruit reflects, and by the chemical action of its juice on the palate; then, so long as we study the action of the light on the retina and optic centres, and consider how the juice sets up in other centres a nervous change known as sweetness, we are occupied with facts belonging to the science of physiology. But we pass into the domain of psychology the moment we inquire how there comes to exist within the organism a relation between X and Y that in some way or other corresponds to the relation between A and B. Psychology is exclusively concerned with this connection between A B and X Y: it has to investigate its nature, its origin, and its meaning."[1]

It is true, as the last chapter showed us, that biology also presupposes a reference to phenomena outside the organism, the very definition of Life being "the continuous adjustment of internal relations to external relations"; so that Mind here appears to be but the highest form of Life. We see here the difficulty of sharply demarcating adjacent provinces of nature. Nevertheless there is a broad distinction, though not a sharp one. Exclude from biological problems all those adjustments which constitute mental reaction upon the environment, and the only external factors remaining are those general conditions of temperature, moisture, food and the like, which are taken for granted once for all. While in each special problem of psychology, the relation between internal and external relations is the main subject of inquiry; on the other hand in special problems of biology, the relation between the internal processes and these general external

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[1] Spencer, *Principles of Psychology*, vol. i. p. 132.

we may, the most we can ever ascertain is that certain nerve-changes succeed certain other nerve-changes or certain external stimuli in a certain definite order. But all this of itself can render no account of the simplest phenomenon of consciousness. As Mr. Spencer well says, "such words as *ideas, feelings, memories, volitions,* have acquired their several meanings through self-analysis, and the distinctions we make between sensations and emotions, or between automatic acts and voluntary acts, can be established only by comparisons among, and classifications of, our mental states. The thoughts and feelings which constitute a consciousness, and are absolutely inaccessible to any but the possessor of that consciousness, form an existence that has no place among the existences with which the rest of the sciences deal. Though accumulated observations and experiments have led us by a very indirect series of inferences to the belief that mind and nervous action are the subjective and objective faces of the same thing, we remain utterly incapable of seeing, and even of imagining, how the two are related. Mind still continues to us a something without any kinship to other things."

Thus we conclude that psychology—though, from the objective point of view, it may be regarded as a branch of biology in the same abstract sense in which biology may be regarded as a branch of geology, and geology as a branch of astronomy—has nevertheless an equal claim with any of these to be ranked as a distinct science. From the subjective point of view it has a superior claim to any of the others. Since here the phenomena studied are directly given in the consciousness of the investigator, there arises a distinction more fundamental than those by which the various departments of objective science are marked off from each other. And, indeed, without some of the data furnished by this unique subjective science, it is impossible to obtain the premises of philosophy; as will at once be admitted, on inquiries, and have contented themselves with scientific methods, psychologists have made discoveries. To say nothing of such recent inquirers as Bain, Wundt, Fechner, and Taine, it may be fairly claimed that, among older speculators, Hobbes, Locke, Leibnitz, Berkeley, Hume, Kant, and Hartley, have by psychologic analysis made real and permanent contributions to our knowledge of mental operations. And at the very date when Comte was preparing his great treatise for publication, there appeared a remarkable book which, by establishing some of the fundamental laws of Association, went far toward placing psychology upon a scientific basis. It is not to the crude and superficial Gall, as Comte would have us believe, that we must give the respect due to the founder of scientific psychology: that respect is due, in far greater degree, to James Mill, the illustrious author of the "Analysis of the Human Mind."

Nevertheless, while psychology is a science clearly distinct from biology, dealing with phenomena which may be classed as super-organic, and using introspective observation as one of its main implements of inquiry, it is no more than any other an absolutely independent science. Since the phenomena of Mind are never manifested to us save in connection with the phenomena of Life, and since the same general formula expresses the fundamental characteristics of the two groups of phenomena, it follows that no complete science of psychology can be constituted without the aid of biology. The conclusions reached by the analysis of subjective states must be shown to be in harmony with the conclusions reached by the synthesis of objective phenomena, before the scientific interpretation of Mind can be regarded as entirely satisfactory. The force of this statement becomes at once apparent, when we recollect that introspective observation can inform us only concerning the mental processes which go on in adult civilized men. In order to understand the genesis of these mental processes, we need the assistance of

Let us now, in accordance with these general considerations, begin by contemplating the phenomena of Mind as gradually differentiated from the phenomena of Life; reserving for another chapter the interpretation of sundry psychological truths in terms of the law of evolution. And first let us reconsider the definition of life which was briefly illustrated in the preceding chapter. We saw that life essentially consists in the continuous adjustment of relations within the organism to relations in the environment. And we saw that the degree of life is low or high, according as the correspondence between internal and external relations is limited or extensive, partial or complete, simple or complex. We saw that the lowest forms of life respond to the changes going on about them only in a simple, imperfect, and general way. A tree, for instance, meeting by changes within itself none but physical and chemical changes which occur with general uniformity in the environment, exhibits life in a very simple and unobtrusive form. We habitually regard it as less alive than a polyp, because the polyp, by displaying nascent sensitiveness and contractility, responds to a greater variety of more special external stimuli. Yet the polyp, possessing no specialized organs of sense, can oppose but one sort of action to many diverse kinds of impression. Phenomena so different as those of light and heat, sound and mechanical impact, can affect it in but one or two ways,—by causing it to move, or by slightly altering its chemical condition. The modes of response to outer relations are few and homogeneous. Passing abruptly to civilized man, at the other end of the animal scale, we find a different state of things. To each kind of external stimulus there are many possible modes of response. Not only, for example, does the human organism sharply distinguish between variations which affect the eye and those which affect the ear; not only do eye and ear, which are themselves organs of amazing complexity, discern an endless number of differing tones and [illegible] as well as a great variety of intensities and qualities [illegible] particular manifestation [illegible] of light [illegible] arousing in the organism very different [illegible] entailing different [illegible] instances. Tennyson's [illegible] in a strange land hears [illegible]

> "And knows [illegible]
> [illegible]
> [illegible] great [illegible]"

will [illegible] a course [illegible] environing relations [illegible] and the extent of his [illegible] and the unskilled [illegible] of Raphael [illegible] different [illegible] impossibility. [illegible] and scarcely the [illegible]

[illegible] between the [illegible] environment. We have [illegible] purely physical [illegible] physical. The [illegible] of the instances, [illegible] external relations. [illegible] the tree are simply [illegible] set up within the [illegible]veness, are never [illegible] nerve-matter, unatt [illegible] strictly be cla [illegible] relations set up civilized man are almost purely psychical, involving only such physico-chemical elements as are necessitated by the fact that conscious activity does not go on unattended by molecular changes in nerve-tissue. It appears, therefore, that while in the vegetal world, and in the lower regions of the animal world, the life is purely or almost purely physico-chemical, it becomes more and more predominantly psychical as we ascend in the animal world, until at the summit it is mainly psychical. The continuous adjustment of inner to outer relations, which both constitutes life and maintains it from moment to moment, is a process which, at first purely physiological, becomes ever more distinctly psychological.

From the facts of comparative anatomy we may elicit a parallel truth. In standard works on human anatomy it is customary to distinguish between the *vegetative* organs, (comprising the nutritive and reproductive systems,) which are developed from the endoderm of the embryo, and the *animal* organs, (comprising the nervo-muscular system,) which are developed from the ectoderm. Not unfrequently these are otherwise and more appropriately distinguished as the *nutritive* and *relational* systems; the special office of the former being the integration of nutritive material, in behoof either of the organism or of its derivative offspring, while the special office of the latter is the maintenance of relations between the organism and the environment. The demarcation is thoroughly distinct, but it is not absolute; since the relations each moment set up even in the nutritive system must correspond with certain general relations of air, temperature, and assimilable material in the environment. Now we have to note that in the vegetal world such general correspondences are all that are established; there is no system of organs differentiated for the purpose of maintaining an equilibrium of relations with the environment. In such simply organized animals as the polyp there is no differentiation of relational tissues or organs; but the entire surface of order to realize with vividness how completely human life has come to mean the higher psychical life, let us try to imagine what life would be without the cerebrum and cerebellum. Yet from the biological point of view these systems of ganglia, though nearly, are not quite, absolutely essential to human life; since the less complex acts and impressions are still coordinated after they have been destroyed by disease, and since infants, born without any brain save the medulla and basal ganglia, have been known to live for a short time. Such a deprivation of the higher relational activities naturally seems to us almost equivalent to deprivation of life.

We may now more thoroughly appreciate the force of the distinction between the provinces of biology and of psychology, which was stated in the earlier part of this chapter. We see that while life, physical and psychical, is the continuous adjustment of inner to outer relations, nevertheless in the lowest forms of life, unaccompanied by mind, the outer relations to which adjustment is made are exceedingly general, and the correspondence is simple, direct and homogeneous. But as we pass to forms somewhat higher, we find, along with this simple correspondence maintained by the whole organism, a number of more complex, indirect, and special correspondences, for the establishment and maintenance of which there is differentiated a particular relational structure. As the correspondence increases in complexity, in indirectness, and in speciality, the maintenance of it is confined more and more to this specialized nervo-muscular structure; and the enormously heterogeneous series of adjustments which eventually goes on becomes distinguished from the relatively homogeneous series of adjustments which has all along been going on, as psychical life in contrast with physical life. Thus by a regular process of evolution it happens that, while at the outset the psychical life is but a slight extension of the correspondence which constitutes the physical life, at the end the correspondence which con-organisms are specialized as tactile. The most perfect organs of touch are the *vibrissæ* or whiskers of the cat, which act as long levers in communicating impulses to the nerve-fibres that terminate in clusters about the dermal sacs in which they are inserted. Yet these whiskers are merely specialized forms of just such hairs as those which cover the bodies of most mammals, and which are found evanescent upon the human skin, embedded in minute sacs or re-entrant folds. Now it is a demonstrated fact that the eye and ear are morphologically identical with *vibrissæ*. The bulb of the eye and the auditory chamber are nothing but extremely-metamorphosed hair-sacs, and the same is true of the olfactory chamber. The crystalline lens is a differentiated hair, the aqueous and vitreous humours are liquefied dermal tissue, and the otolites of the ear are "concretions from the contents of an epidermic sac." In view of these astounding disclosures of embryology, we may readily assent to Mr. Spencer's statement that modern science justifies the guess of Demokritos, "that all the senses are modifications of touch." From a single sense, more or less diffused over the surface of the body, and capable of establishing correspondences only with agencies in direct contact with the body, there have arisen, by slow differentiations, such localized senses as sight and hearing, which serve to enlarge the environment and establish correspondences with agencies more and more remote. Let us briefly consider the sense of sight, omitting hearing, as well as smell and taste, since our space is too limited to deal with them properly.

In such lowly organized creatures as the hydra the ability to distinguish between light and darkness, or between sunshine and shadow, is possessed in a slight degree by the entire surface of the body. But vision can hardly be said to exist, even in its most rudimentary aspect, until this sensibility is "concentrated in a particular spot. The rudimentary eye consisting, as in a planaria, of some pigment senses." And in man, by the aid of science, the correspondence is extended not only over the entire surface of the earth, but through all visible space; witness the facts that telegraphic reports enable purchasers in New York to adapt their actions to prices in London, and that the inferences of astronomers are modified in accordance with chemical changes going on in remote nebulæ.

Along with the extension of the correspondence in space there goes on an extension in time, resulting in an enormous increase of the psychical life. Under their more simple forms the two kinds of extension go on together. The rudimentary eye, which enables the organism to anticipate the contact of an approaching opaque body, may serve to illustrate the primitive connection between adjustments to external coexistences and adjustments to external sequences. And it is obvious, without concrete illustration, that in general the more remote are the outer relations to which inner relations are adjusted, the longer will be the interval by which the adjustment may be made to anticipate the group of outer relations which it is designed to balance. But it is only in the higher vertebrates, whose cephalic ganglia are sufficiently large and complex to enable them to form ideal representations of outer relations not immediately present, that there is witnessed a decided extension of the correspondence in time. Dogs and foxes exhibit a well-marked anticipation of future events, in hiding food to be eaten hereafter. But it is first in the human race that such foresight becomes highly conspicuous; and the difference between civilized and savage men in this respect is probably even more marked than the difference between savage men and the higher allied mammals. There are strong reasons for believing that the more complex correspondences in time are chiefly effected by the cerebrum, while the more complex correspondences in space are chiefly effected by the cerebellum. And if this be the case, we may understand why it is that in the course of

ments. Such special adjustments are seen in the cases of " the lion that goes to the river-side at dusk to lie in wait for creatures coming to drink, and the house-dog standing outside the door in expectation that some one will presently open it." But the increase in speciality of adjustment is most conspicuously exemplified in the progress of the human race; as is seen by contrasting the savage who sharpens his arrows in expectation of the periodic flight of certain birds, with the astronomer who at a given day, hour, and minute, adjusts his telescope to watch a transit of Venus.

In the life of the highest animals, and especially in the life of the human race, characterized as it is by the predominant activity of the great cephalic ganglia, there is witnessed an increase in the generality of the correspondence, parallel with the increase in speciality. As this topic falls almost entirely within the province of sociology, the illustration of it must be reserved for a future chapter. Let it here suffice to recall the fact, already mentioned, (Part I. Chap. viii.,) that the progress of human knowledge has all along been equally characterized by analysis and by synthesis,—by the differentiation implied in the recognition of relations that are more and more special, as well as by the integration implied in the grouping of relations in classes that are more and more general.

Along with the increase of the correspondence in spatial and temporal remoteness, in speciality and in generality, there is a continuous increase in complexity. Indeed, in the various aspects of psychical progress already contemplated, this aspect has been continually illustrated. Obviously the development of sense-organs, while widening the environment and increasing the number of relations to which the organism may adjust itself, enhances also the complexity of the adjustments. Contrast the simple movements of the planaria when an opaque object passes before its rudimentary eye, with the complex movements of a cat when a mouse is of life. The amount of normal longevity in any species depends upon the definite heterogeneity of the adaptation of its individual members to environing circumstances, and also upon the ratio of their nutrition to their expenditure. But the preponderant importance of the former factor is seen in the fact that, in spite of their immensely greater personal expenditure, the higher animals are, as a rule, very much longer lived than the lower ones. In the civilized human races also, as contrasted with the savage races, the life is not only higher in degree but longer in duration: the longevity of the lowest savages rarely exceeds forty-five years.

As we proceed to survey, in a single view, the various truths here separately elucidated, we find that the essential distinction, above insisted on, between the sciences of biology and psychology, is thoroughly justified by the very facts which illustrate the close connection between the two. The foregoing exposition conclusively proves that in dealing with the adjustments of inner to outer actions, biology "limits itself to the few in which the outer actions are those of agents in actual contact with the organism—food, aerated medium, and things which produce certain effects by touch (as insects which fertilize flowers); thus leaving to psychology all other adjustments of inner to outer actions." "The moment we rose to a type of creature which adjusts certain organic relations to relations of which both terms are not presented to its surface, we passed into adjustments of the psychological order. As soon as there exists a rudimentary eye capable of receiving an impression from a moving object about to strike the organism, and so rendering it possible for the organism to make some adapted movement, there is shown the dawn of actions which we distinguish as intelligent. As soon as the organism, feebly sensitive to a jar or vibration propagated through its medium, contracts itself so as to be in less danger from the adjacent source of disturbance, we perceive [illegible] classed as psychical. This is [illegible] spondence exhibits some [illegible] increase of speciality or complexity [illegible] the boundary between physical [illegible]

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[1] Spencer, Principles of Psychology, [illegible]

CHAPTER XV.

THE COMPOSITION OF MIND.

In pursuing the analysis of a complex series of phenomena, with the object of ascertaining the simple ultimate elements of which the complex series is made up, we shall sometimes most satisfactorily accomplish our purpose if we begin with the most complicated cases which the series presents. After explaining these by resolving them into their less complex components, our analysis "must proceed similarly with these components; and so, by successive decompositions, must descend to the simpler and more general, reaching at last the simplest and most general." Let us proceed, after this fashion, to inquire into the Composition of Mind. Beginning with the most highly-involved operations of conscious intelligence, and neglecting, for the time being, the consideration of those emotional states by which all operations of intelligence are to a greater or less degree accompanied, let us pursue our analysis until we have arrived at those ultimate units of feeling in the manifold compounding of which all conscious operations, whether intellectual or emotional, consist.

Beginning, then, with a somewhat complicated operation of intelligence, let us consider the process by which an astronomer, knowing the dimensions of the earth, is enabled to calculate therefrom the distance of the moon. He must, in the first place, assimilate in thought the case of the moon to like cases in which the distances of inaccessible objects upon the earth are indirectly measured. When a land-surveyor wishes to ascertain the distance of a church-tower situated on the farther side of a river, he has recourse to an indirect method of measurement. Upon his own side of the river he first measures the distance between two points sufficiently removed from each other, and this distance he calls a base-line. From each end of the base-line he now takes a sight at the inaccessible tower, and with the proper instruments, measures the difference between its direction and the direction of the base-line. In this way he obtains an ideal triangle, of which the tower is the apex; and knowing the length of the base-line, and the value of the two angles at the ends of the base-line he calculates by trigonometry the length of the two sides which express the distance of the tower from the ends of the base-line. Now, the astronomer, imitating this process, assumes as a base-line the known distance between two remote points on the earth's surface, as for example London and Cape Town; and then from each of these points he proceeds to take the bearings of the moon. The process, indeed, is here complicated by the fact that, owing to the long distance, the inequalities of the earth's surface, and its curvature, the observer at Cape Town cannot see the position of London, and *vice versâ*. It is necessary, therefore, again to resort to an indirect method, and, having measured the meridional bearings of the moon from the north-pole at London and from the south-pole at Cape Town, to compare these bearings with the knowledge that the bearing of the one pole from the other is 180 degrees [illegible]. A further correction must be made [illegible] and Cape Town are not in the same meridian. [illegible] garding these steps in the process as [illegible] plicating our case, we [illegible] has thus indirectly measured the [illegible] drawn to the moon must make at the two ends of his long base-line from London to Cape Town, he is at once enabled, like the land-surveyor, to calculate by trigonometry the lengths of these ideal lines, and thus to ascertain the moon's distance. What, now, is the essential characteristic of the process which the astronomer goes through? Or, in other words, what is the fundamental psychical process by the manifold compounding of which is built up this highly-complex series of inferences?

From beginning to end, the fundamental process is the cognition of the equality of sundry relations. The thought which underlies and determines the whole calculation is the cognition that the relations between the sides and angles of a great triangle, having for its apex the moon, and for its base the chord of the arc of the meridian of London measured to a point in the southern hemisphere upon the same parallel with Cape Town, are equal to the relations between the sides and angles of a similar small triangle, having an inaccessible tower for its apex and a measured line of five or six rods for its base; and that these relations, in turn, are equal to the relations between the sides and angles of a still smaller and similar triangle which may be drawn on a sheet of paper, and of which the sides and angles may, if necessary, be directly measured. Now, this cognition implies the previous establishment, in the calculator's mind, of sundry cognitions of the equalities and inequalities of certain relations between the sides and angles of triangles. To show briefly how such cognitions have been established, let us cite the simplest case —that in which the two angles at the base of an isosceles triangle are recognized as equal to each other. Euclid establishes this point by supposing two similar and equal isosceles triangles, of which the one is turned over and placed upon the other, so that the apex and one side of the one will coincide with the apex and opposite side of the other. Then the other sides and the bases must respectively coincide, otherwise the two triangles would not be similar and equ[illegible] and the conditions of the case would be violated. All [illegible] sides being thus equal, each to each, the two triangles must everywhere coincide, and consequently the two basal angles must be equal, both in the triangle which has been turned over and in the one which has kept its original position. Now, each step of this demonstration is a cognition of the equality of a pair of relations of length or of direction; and in each case this cognition is e[illegible], not by any anterior demonstration, but by direct in[illegible]on. Or, in other words, when it is said that two lines [illegible] qual length, starting from the same point, and running [illegible] the same direction, must coincide at their farther extre[illegible]ties, the truth of the statement is at once recognized *simply because the states of consciousness which we call the ideas of the two lines are totally indistinguishable from each other.* This immediate perception of the equality—or, in some cases, of the inequality—between two or more relations of position or magnitude is the goal toward which every geometrical demonstration tends. And, still more, it is the mental act implied in every step of every such demonstration. All the devices familiar to the reader of Euclid—the bisecting of lines and angles, the drawing of parallels and the circumscribing of circles for argumentative purposes—are simply devices for bringing a given pair of space-relations directly into consciousness, so that their equality or inequality may be recognized by direct comparison.

Manifestly the case is the same in that algebraic reasoning which our astronomer will often find it desirable to employ, in the course of his com[illegible] [illegible] The axiom that relations [illegible] tion are equal to each other [illegible] the immediate recogn[illegible] [illegible] relations. And [illegible] science of algebra [illegible] in one of the mos[illegible] simplification may be thereby achieved, it is usual to throw any two forms of an equation into a proportion—a procedure in which the equality of the relations is specifically asserted." To cite Mr. Spencer's simple illustration: if we take any equation, $2\,xy=y^2$, and, dividing it by y, obtain a second equation, $2\,x=y$, the legitimacy of our proceeding is at once rendered apparent when the two equations are thrown together in a proportion, in which it is asserted that the ratio of $2\,xy$ to y^2 is equal to the ratio of $2\,x$ to y. Or, if any doubt still remain as to the correctness of this, we resort to the familiar device of multiplying extremes and means, and obtain the identical proposition $2\,xy^2=2\,xy^2$, in which the identity of the two terms is immediately cognized, because the states of consciousness which they evoke are indistinguishable from one another.

Thus the complicated quantitative reasoning by which an astronomer determines the distance of a heavenly body consists in the long-continued compounding of immediate cognitions of the equality or inequality of two or more given relations or groups of relations of position and magnitude.

Before proceeding to unfold all that is implied by this conclusion, let us consider another concrete example of a somewhat different kind. When a certain horned animal, of slender figure, with cloven hoofs, and a hairy integument, is presented to the inspection of a naturalist, he at once recognizes it as a giraffe; and, if required further to describe it, he observes that, as having four stomachs and chewing the cud, it belongs to the sub-order of ruminants; as having its toes firmly united in a solid hoof, it belongs to the order of ungulata; as having mammary glands and suckling its young, it belongs to the class of mammals; and, as having an internal bony skeleton, it belongs to the sub-kingdom of vertebrates. What, now, is the mental act which is repeated at each stage of this description? It is "a cognition of the fact that the relation between particular attributes in this animal is like the relation between homologous attributes in certain other animals." To confine ourselves to the first clause of the description—"the attributes implied by the term *ruminant* can be known only as previously observed or described; and the predication of these, as possessed by the animal under remark, is the predication of attributes *like* certain before-known attributes. Once more, there is no assignable reason why, in this particular case, a relation of coexistence should be thought, between 'such attributes as the possession of four stomachs and the possession of horns and cloven hoofs,' unless as being *like* certain relations of coexistence previously known; and, whether the thinking of this relation can be otherwise accounted for or not, it is clear that the predication cannot otherwise have any probability, much less certainty."[1] The case is the same with the remaining clauses of the description. In each instance the mental operation performed by the naturalist is the recognition of the likeness between certain groups of relations observed in this giraffe and certain other groups of relations previously classified as pertaining to ruminants, ungulata, mammals, and vertebrates. Obviously, therefore, the reasoning by which the places of animals in the zoological scale are determined, consists in the compounding of cognitions of likeness or unlikeness between certain given groups of relations.

So far, then, the mental operation performed by the naturalist seems to be not unlike that performed by the astronomer. And indeed, in spite of the superficial difference which seems so widely to separate the classification of animals from the measurement of celestial spaces, it will appear, on a moment's reflection, that the only real difference between the mental processes involved in the former case, and those involved in the latter, is the extent to which *likeness* is predicated of the relations concerned. Deeply considered, the act of the astronomer is the same as that of the naturalist, save that, while the former classifies together sundry groups of relations as *equal* to one another, or indistinguishable from one another, the latter classifies together sundry groups of relations as *like* one another, or but slightly distinguishable from one another. Now, in this statement we see that what is meant by *equality* is merely *exact likeness;* but something more is needed for the accurate description of the difference between the two cases. The objects which the astronomer contemplates are simple triangles, presenting simple relations of position and magnitude; while the objects contemplated by the naturalist are complex organisms, presenting immensely compounded relations of structure and function. Now, in speaking of simple things or simple relations, such as lengths and breadths, weights, times, and velocities, we habitually predicate *equality* or *inequality* of them. "Wherever the terms of the comparison, being both elementary, have only one aspect under which they can be regarded, and can be specifically posited as either distinguishable or indistinguishable, we call them either *unequal* or *equal.* But when we pass to complex things, exhibiting at once the attributes, size, form, colour, weight, texture, hardness—things which, if equal in some particulars, are rarely equal in all, and therefore rarely indistinguishable—then we use the term *like* to express, partly the approximate equality of the several attributes separately considered, and partly the grouping of them in a parallel manner in time and space. Similarly with the relations involved in reasoning. If simple, they are recognized as *equal* or *unequal;* if complex, as *like* or *unlike.*"

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[1] Spencer, *Principles of Psychology*, vol. ii. p. 69.

The essential difference, then, between the quantitative reasoning employed in the most advanced sciences, and the qualitative reasoning employed in those which are less advanced, may be thus stated: in the first case the relations contemplated are so simple that they may be directly juxta-

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which these relations are cognized as equal or unequal, like or unlike—let us now advance a step farther. Already, in the course of the foregoing analysis, the essential similarity between reasoning and classification has been vividly brought before us. We have now to scrutinize this similarity somewhat more closely.

To cite an example with which we are already familiar: when our astronomer, some thirty years ago, observed that certain irregularities in the motions of Uranus still remained unaccounted for, after calculating the combined effects of all the interior planets in producing such irregularities, it occurred to him that the unexplained irregularities could only be due to the gravitative force of some undiscovered planet outside of Uranus; and the discovery of Neptune was the result of this most brilliant hypothesis. Now, the mental act involved in this deduction was essentially a *classification of cases.* The case of the unexplained perturbations was mentally ranked along with the several cases of explained perturbations presented by the solar system, as being similarly due to gravitative force; and to the number of known cases in which planets deflect each other from the regular paths in which they would otherwise move, a new hypothetical case was added. Comparing, now, this mental operation with that of the naturalist who, by virtue of certain observed likenesses of structure and function, ranks together lions, and elephants, and seals, in the class of mammals, we may conclude roughly that the one process consists in the formation of a group of *like cases,* while the other consists in the formation of a group of *like things.* And since by the expression "like cases" we mean merely "like sets of relations among two or more given groups of things," it follows that we may characterize Reasoning as the *classification of relations,* while Classification, ordinarily so called, is the *classification of things.* When, for example, on perceiving two similar triangles set side by side, we proceed to make some much an act of classification, as the act by virtue of which the naturalist would rank a newly-found horned and cloven-hoofed mammal among the ruminants; the only difference being that in ordinary perception the act has been performed so frequently as to have become automatic at an early period of life, while in scientific classification the act involves more or less conscious thinking, and comparison of relations.

Here, in this last clause, there is hinted what we are seeking for. Not only in scientific classification, but in ordinary perception also, there must go on a comparison of relations, and a grouping of them as like or unlike. In perceiving an apple, for example, " the bulk is perceived to be like the bulk of apples in general; the form like their forms; the colour like their colours; the surface like their surfaces; and so on." For if the bulk were like that of a water-melon, or if the shape were cubical, or if the colour were inky black, or if the surface were covered with thorns, the object would not be perceived to be an apple. The act of perception, therefore, consists in the recognition of sundry attributes as like sundry attributes previously known, and as having relations to one another like the relations between the before-known attributes. This will appear still more clearly, when we recollect what takes place in visual perception. It is well known that the eye, unassisted by the muscular and tactual senses, can take no cognizance of distance, shape, or solidity —the only impressions which the retina receives are impressions of colour, and indirectly of superficial extension. It is because of this that infants reach out for the moon, and that blind men, on first receiving sight, are unable to distinguish between a round orange and a cubical block, without feeling the surfaces of the two. Only after repeated and careful comparison of visual impressions with muscular and taetual impressions is the patient enabled to discover, by the eye alone, that all the objects in the room or in the landscape are not in contact with his body; and it is only after a similar elaborate comparison that the young child achieves the feat of looking at an object in a given direction, or of recognizing by vision his father or mother. Accordingly, when looking about the room, all that you really see is a congeries of coloured spots. Your knowledge of the presence of divers objects—chairs, windows, mirror, mantel-piece—is not given in the act of vision, but is the result of an exceedingly complex, though apparently instantaneous, process of reasoning. Your seemingly immediate knowledge that a certain group of coloured spots means a chair is due to the fact, that from early infancy this group of coloured spots, or some other like group, has been associated with sundry impressions of touch and resistance, and with sensations yielded by the little muscles which turn the eye hither and thither. The frequency with which the association has been repeated has rendered the process of inference automatic, just as, to a less-marked extent, the process of reading, at first accompanied by a conscious classification of every letter, has become automatic, so that we are not aware of cognizing the letters at all. Nevertheless, although too rapid to rise into consciousness, the process is still one of inference, implying, like any other process of inference, the grouping of certain relations as like or unlike certain other relations. Certain correlated groups of colours are automatically classified with other correlated groups of colours previously received upon the retina, and also with certain correlated groups of muscular and tactual impressions, previously received simultaneously with the groups of colours in question. Thus our visual perception of objects consists of a group of sensations *plus* a complicated series of inferences which does not differ fundamentally from a process of scientific demonstration. And the same truth may be with equal justice, though less vividly, illustrated in the case of any other sense than sight. A much simpler case than that of visual perception is that of a spoon.

containing some unknown liquid, thrust into the mouth by another person in the dark. Here the only clue to the character of the liquid is its taste; and when, by its peculiar mild pungency, the liquid is recognized as bromide of potassium, the psychical process consists of a gustatory sensation *plus* an act of classification by which the sensation is grouped with other like sensations previously received. The example is a good one, as showing us also the obverse case. If bromide of potassium has not been previously tasted, the result is simply gustatory sensation unattended by perception; or rather, it is gustatory sensation generically classified as mildly pungent, but not specifically referred to any known liquid, and therefore only partially interpreted. There is perception, but it is incomplete.

It is not pretended that these psychological truths are established by the crude and fragmentary exposition here given. The numerous observations and experiments upon which they are based would be very interesting to recount; but our space does not admit of detailed proof, nor is it needed; since these truths are the common property of psychologists, and will be questioned by no competent student of the phenomena of mind. Referring, for minute and elaborate proof, to Mr. Spencer's "Principles of Psychology," let us be content with setting down the implication which is common to all these conclusions; namely, that between the various psychical processes thus far contemplated, which include alike the measurement of celestial distances by the astronomer, and the direct perception of objects by the unlearned child, or indeed by the ape or dog, there is generic identity. The fundamental characteristic which is common to them all is the reception of certain groups of sensations, accompanied by the classification of these groups of sensations, and of the relations between them, according to their various likenesses and unlikenesses. The difference between the highest and the lowest of the processes thus brought together consists solely in the heterogeneity and definiteness of the groups which are classified, and in the extent to which the classifications are compounded.

To such a statement, however, there is one essential qualification to be added. It is not strictly correct to say that the classification involved alike in the most complex act of reasoning and in the simplest act of perception is a classification of groups of *sensations* and of the relations between them. For, when an object is perceived, along with the sensations actually present, there are remembered or internally-revived sensations which enter into the classification, and these internally-revived sensations are what we call ideas or images. For example, "when passing the finger over a rough surface, the perception contains very much more than the coordinated sensations immediately experienced. Along with these there go the remembered visual impressions produced by such a surface, which cannot be kept out of the mind, and in the suggestion of which the perception largely consists; and there are automatic inferences respecting the texture and density of the substance." So when we see an orange lying on the table, the only sensation actually present and entering into the case is the sensation of a patch of reddish-yellow colour surrounded by other unlike patches of colour. The other elements in the classification of which the perception consists are ideas or internally-revived sensations of position, shape, bulk, texture, juiciness, and so on. And now we discover another point of difference in degree between perception and reasoning. While in perception some of the elements classified must be sensations actually present, in reasoning *all* the elements classified may be ideas or internally-revived sensations. The sides and angles of the isosceles triangles which the astronomer compares in estimating the moon's distance are ideal sides and angles; and the naturalist, in writing about the classification of ruminants, deals solely with internally-revived impressions of horns, hoofs, and multiple stomachs, which were previously present to sense. Thus the classification involved in reasoning differs from that involved in perception, not only in heterogeneity and definiteness, but also in *indirectness*. Nevertheless the difference is not fundamental, but is only a difference in degree; as is proved by the fact that alike in reasoning and in perception there is implied the previous reception of the actually present sensations of which the ideas or revived sensations are the copies. Our statement, therefore, will become strictly correct if we say that the fundamental characteristic common to the most refined reasoning, and the crudest perception, is the presence of certain *states of consciousness*, accompanied by the classification of these states and of the relations between them according to their various likenesses and unlikenesses; the differences between the processes being differences in heterogeneity, definiteness, indirectness, and extent of integration or compounding.

Let us next observe that, as between the highest and lowest kinds of reasoning there is a great difference in the extent to which the comparison of relations is carried, so between the highest and lowest kinds of perception there is a similar difference.

There is a striking contrast in degree of directness "between the perception that some surface touched by the finger is hard, and the perception that a building at which we are looking is a cathedral. The one piece of knowledge is almost immediate. The other is mediate in a double, a triple, a quadruple, and even in a still higher degree. It is mediate inasmuch as the solidity of that which causes the visual impression is inferential; mediate inasmuch as its position, its size, its shape, are inferential; mediate inasmuch as its material, its hollowness, are inferential; mediate inasmuch as its ecclesiastical purpose is an inference from these inferences; and mediate inasmuch as the identification of it as a particular cathedral is a still more remote inference resulting from the union of these inferences with those many others through which the locality is recognized."[1] From this example it appears that while, at the highest extreme, perception emerges into reasoning, on the other hand at the lowest extreme, as where a body is perceived to be rough or hard, it borders very closely upon simple sensation. Proceeding, then, a step further in our descending analysis, we have to examine the character of the difference between perception and sensation.

Sensation, no less than perception, has a variety of grades. At the one extreme it rises to a point where it is barely distinguishable from perception; at the other extreme it lapses into an unconscious or sub-conscious psychical state. While writing these lines the sum-total of my consciousness may contain elements contributed by dull sounds of persons walking overhead, by the rumbling of wagons in the street, by faint odours wafted from the kitchen, by soothing pulses of sensation from the pipe held in my mouth, and by the occasional striking of the cuckoo-clock, as well as by the pressure exerted by the chair in which I am sitting and the table upon which my arm is resting and the pen which is grasped in my fingers. But while I am absorbed in thought none of these elements rise into the foreground of consciousness; though they are present as psychical states, as is shown by the fact that the going out of the pipe or the failure of the clock to strike is noticed, yet I become *conscious* of them, in the ordinary sense of the word, 'only when they pass a certain degree of intensity,' as when a child overhead falls on the floor or when the shriek and rumble of a passing railway-train are added to the confused mass of out-door noises, "and only then can I be said to experience" these feelings "as sensations." But when a psychical state rises into the foreground of consciousness and becomes known as a sensation, as when my finger happens to touch the heated pipe bowl, then "I not only contemplate the affection as an affection of myself—as a state through which my consciousness is passing or has passed—but I also contemplate it as existing in a certain part of my body—as standing in certain relations of position. I perceive *where* it is." The close relationship between sensation and perception is illustrated by this example: nevertheless psychology here distinguishes between two portions of the mental act. Though in the practical experience there is no separation between the two, yet analysis enables us to distinguish between the consciousness of the painful feeling and the consciousness of the presence of the heated object which causes the feeling; and the former of these we call sensation, while the latter we call perception.

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[1] Spencer, *Principles of Psychology*, vol. ii. p. 248.

We shall now be greatly assisted by observing a psychological fact of which Sir William Hamilton caught a glimpse, though, as usual, his analysis was not sufficiently thorough, and his statement of the case was inaccurate. We need not pause to criticize the theorem that while "perception proper and sensation proper exist only as they coexist, in the degree or intensity of their existence they are always found in an inverse ratio to each other;" for its inaccuracy has been fully demonstrated by Mr. Mill and also by Mr. Spencer, who shows the true statement to be, "not that sensation and perception vary inversely, but that they exclude each other with degrees of stringency which vary inversely." To illustrate this, we will suppose that you are getting water from a hot-water faucet, and that, as the water begins by running cold, you clasp your hand about the faucet so as to turn it off when the water has become sufficiently warm. While the water is cool or tepid, sensation is at the minimum, and not only is there no exclusion of perception, but consciousness is occupied with the outer phenomena, the faucet and the running water, more than with the inner phenomenon, the feeling of temperature. The pointed end of the upright part of the faucet, and the protuberance where the horizontal piece is fitted upon it, awaken tactual sensations which coexist with the sensation of temperature, and the automatic comparison of these sensations which constitutes the perception of the faucet goes on unhindered. To concentrate consciousness upon the feeling of temperature requires a voluntary act of attention, induced by the desire to know how warm the water is getting. As the water becomes very much warmer, so as to be slightly uncomfortable, the perception of the faucet does not become gradually less vivid, but it tends to disappear entirely, and consciousness tends to occupy itself exclusively with the feeling of temperature. Only through a distinct voluntary effort can the perception be made to come into the foreground of consciousness. If, now, there comes a sudden spurt of very hot water, the tactual perception of the faucet is for the moment entirely excluded, and the perceptive act implied in the estimati of the degree of temperature is also expelled from consciou ness, which is occupied entirely with the sensation of pain, inducing a violent withdrawal of the hand. Here sensation, reaching a maximum, has quite driven out the group of tactual perceptions, and even visual perceptions are to that extent held in abeyance, that for the moment they cease to occupy the attention. If, now, a piece of soap is taken from its dish, the newly-aroused group of sensations—of weight, hardness, smoothness, and the rest—exist in minimum intensity, and consciousness is occupied, not with them, but with the presence of the piece of soap: perception tends to exclude sensation.

"What, now," inquires Mr. Spencer, "is the real nature of this mutual exclusion? Is it not an instance of the general fact that consciousness cannot be in two equally distinct states at the same time; and that in proportion as the predominance of one state becomes more marked, the suppression of other states becomes more decided? I cannot know that I have a sensation without, for the moment, having my attention specially occupied with that sensation. I cannot know the external thing causing it, without, for the moment, having my attention specially occupied with that external thing. As either cognition rises, the other ceases." By the "external thing," Mr. Spencer does not here mean the *Ding an sich*, but the group of phenomena which are referred to an existence outside of the organism. But we have already seen that, when consciousness is so occupied with such a group of phenomena that the result is the perception of an object, the psychical act involved is an automatic classification of sundry states of consciousness and of the relations between them, according to their various likenesses and unlikenesses. Thus we arrive at the distinction between sensation and perception. Impossible as it is to disentangle the two in practical experience, analysis yet distinguishes the former as an apparently elementary state of consciousness, while the latter is "a discerning of the relations between states of consciousness." According, therefore, as attention is directed chiefly to a conscious feeling or to the relations between a number of feelings, is now sensation and then perception predominant.

It remains to be observed that sensations, or—as we may otherwise call them—feelings, are either peripherally or centrally initiated. In other words, a feeling may either originate at the surface of the organism—as is the case with sensations of sight, hearing, smell, taste, and touch, and in the main with muscular and thermal sensations; or it may originate in the interior of the organism—as is the case with the sensations of hunger and repletion, and with certain muscular sensations, such as cramp; or, again, it may start from some group of nerve-centres, as is the case with those vague feelings which accompany more or less complex acts of perception and reasoning, and which, when they acquire a certain degree of prominence, we call emotions. By the inclusion these states of consciousness, the term "feeling" cov somewhat wider range of meaning than the term "sensation." Nevertheless the current use of the word "feeling" to designate indifferently a sensation or an emotion bears unconscious witness to the fact that the two kinds of psychical state differ only in their modes of genesis and of composition. The contrast between a peripheral sensation, as of colour or touch, and an emotion, is chiefly a contrast in degree of definiteness and of localization. But this contrast holds also between peripheral sensations and such vague internal sensations as hunger, which, being known as cravings, are assimilated to the lowest orders of emotion. From this difference in definiteness arises the fact that the peripheral sensations admit of being definitely grouped according to their relations of likeness and unlikeness, and thus afford the material for perception and reasoning, while emotional states admit no such definite grouping, but arrange themselves variously in clusters, the particular character of the cluster being determined by certain contemporaneous perceptions or ideal reproductions of past perceptions. For these reasons the ultimate psychological nature of emotion can be reached only through a synthetical interpretation which starts by recognizing the fact that, along with that classifying of conscious states which occurs in perception and reasoning, there goes on a recognition of certain states as pleasurable or desirable to retain in consciousness, and a recognition of certain other states as painful or desirable to expel from consciousness. Thus in practical experience emotions are, in however slight a degree, inseparably associated with perceptions and inferences, as the vague, internally-initiated feelings [illegible] the definite peripheral feelings in the classifying [illegible] perceptions and inferences consist.

Looking back, now, over the [illegible], we find that we have passed in review [illegible] mental operations which differ immensely [illegible] of them being performed only by the [illegible] adult civilized men, while others are performed habitually by children, barbarians, and numerous animals inferior to man. Yet, amid all this diversity, our analysis has detected a fundamental unity. In spite of their vast differences in complexity, we have seen that all these mental operations are ultimately made up of the same psychical process. The grouping of the relations among feelings is the elementary act which is repeated alike in each simple and direct act of perception, and in each complicated and indirect act of ratiocination. At the present stage of our analysis, therefore, the ultimate elements of mind would seem to be *feelings* and the *relations between feelings*. It remains to add that relations themselves must be secondary feelings due to the bringing together of primary feelings. We can know a relation only as some modification of consciousness resulting from some combination of the feelings directly aroused in us by inner or outer agencies; and such modification of consciousness must be itself a kind of feeling. For further illustration let us briefly mention the different relations in the order of their decreasing complexity, that we may note the fundamental relation involved in them all. The most complex relations are those of *similarity* and *dissimilarity*, as exemplified when we recognize the kinship between a thorough-bred race-horse and a Shetland pony, or the complicated divergences between a city and a village. Simpler relations are those of *cointension* and *non-cointension*, as when we perceive that two sounds are equal in degree of loudness, or that in grasping wood and in grasping marble the feelings of temperature are different in degree; of *coextension* and *non-coextension*, as when two lines or two areas are seen to be equal or unequal; of *coexistence* and *non-coexistence*, as when the yellow-reddish light reflected by an orange is regarded as accompanied by sweetness and juiciness, but not by viscidity; of *connature* and *non-connature*, as when greater warmth is mentally assimilated to less warmth, but distinguished from blueness or roughness. Now, underlyi[illegible] these relations, and all mental processes whatever, is the relation of *likeness* and *unlikeness* between primary states of consciousness. Given the power of recognizing two feelings or conscious states as like each other, and two other feelings or conscious states as unlike each other, and we have the primordial process in the manifold compounding of which all operations of intelligence consist. Let us now take into the account the universally-admitted fact that consciousness is rendered possible only by ceaseless change of state—that a uniform state of consciousness is in no respect different from complete unconsciousness. If our minds were to become spellbound, like the palace of the Sleeping Beauty, all our thoughts and feelings remaining fixed *in statu quo*, our conscious existence would be practically at an end. For consciousness to exist at all, it is necessary that a given state should be followed by a different state. But this is not all that is required. A succession of feelings, of which no two were alike, would not give rise to consciousness, since the recognition of any feeling implies its classification with some antecedent like feeling. Consciousness, therefore, "is not simply a succession of changes, but an *orderly* succession of changes—a succession of changes *combined and arranged* in special ways." Thus we reach the law of the Composition of Mind. Since intelligence cannot arise or continue unless consciousness is continually passing from one state into a different state, it follows that there must be a continuous *differentiation* of states; and again, since intelligence cannot arise or continue unless particular states of consciousness are continually known as like certain previous states, it follows that there must be a continuous *integration* of states. Alike in the most rudimentary perception and in the most developed reasoning, the essential [illegible] the separation of the unlike and the bringing [illegible] the like. So that, "under its most general [illegible] whatever is definable as *the* [illegible] *and integration of* *states of consciousness,*" and the kind of mental action is regarded as high or low, according to the greater or less extent to which the differentiation and integration are carried. The phenomena of conscious intelligence are thus seen to conform to the universal law of evolution; and we may further note that this conclusion is entirely in harmony with the definition of psychical life as the continuous adjustment of inner to outer relations. For clearly, when an intelligence is developing in the midst of a complex environment, the greater the number of subjective relations which are adjusted to objective relations, the greater will be the extent to which the differentiation and integration of conscious states will be carried.

Here we may seem to have arrived at a satisfactory conclusion of our analysis. But the lowest depths of the problem yet remain to be sounded, as will be seen when we consider a superficial objection not unfrequently urged against the foregoing views. Alike in all the mental operations which have formed the subject-matter of our analysis, we have seen that the relations of likeness and unlikeness entering into the case are classified with certain other relations of likeness and unlikeness previously cognized. The thought which determines the astronomer in calculating the moon's distance, implies previous experience of triangles and of numerical relations. In the classification of a giraffe there is implied previous acquaintance with the complex relations of structure and function connoted by the terms *ruminant*, *ungulate*, *monodelphian*, *mammal*, *vertebrate*, and *animal*. The perception of an apple implies numerous antecedent experiences of colour, size, configuration, smoothness, odour, and taste. And in like manner, though we have provisionally defined a sensation as an "elementary state of consciousness," yet we have also seen that, in order to become truly conscious of a sensation, we must know it, or, in other words, must classify it with some like sensation previously felt.

[illegible] an infant [illegible]

[illegible] of [illegible], the [illegible]
the quantity of them. The latter hypothesis is as
as the former to the Doctrine of Evolution, and is
as decidedly negatived by the observation of facts.
us observe what is implied by the [illegible] of a

definite cognition by an infant. If the foregoing analysis be taken as correct, it is obvious that when any object, as an orange, is first presented to the mind of an infant, it cannot be perceived or identified as an orange. Before this intellectual feat can be achieved, there must go on for some time that complicated grouping of visual, tactual, and gustatory sensations above described. In accordance with the established theory of vision, we must admit that, when the orange is held before the child's eye, the only sensation aroused is that of a reddish-yellow colour, which cannot even be perceived to be round until after it has been associated with sundry tactual sensations. But this is not all. Not even the sensation of a reddish-yellow colour can acquire definite shape in consciousness, until sensations of blue, or red, or green, or white colour, have been aroused, with which it can be contrasted, and until a subsequent like sensation of reddish-yellow colour has been aroused to which it can be assimilated. Observe, now, the position into which we are brought. We are obliged to hold that the first sensation of orange-colour cannot, strictly speaking, exist as a sensation at all; while, nevertheless, a subsequent sensation of orange-colour (not, in any actual case, the second, but the twentieth or hundredth) occurring after intervening sensations of blue or green, can acquire definite shape as a sensation by being compared with this first sensation which is not strictly a sensation. Obviously, then, though the first presentation of orange-colour cannot awaken a visual sensation which can be known as such, it must produce some psychical state which is real, though not known. For if no psychical state were produced by the first presentation, then the second, or twentieth, or hundredth presentation could no more awaken a definite state of consciousness than the first. We are thus led to the assertion that states of consciousness may be produced by the differential grouping or compounding of psychical states which are beneath consciousness.

[illegible] points toward the [illegible] a composition of a [illegible] by M. Lame in [illegible]

In musical sounds three characteristics are to be distinguished—loudness, pitch, and quality or timbre. The first of these, the loudness, depends upon the amplitude of the atmospheric waves by which the sensation of sound is caused. A series of sound-producing waves, like any other series of waves, has its elevations and depressions, and the height of the elevation above the depression is called the *amplitude* of the wave. The loudness of the sound varies as the square of the wave's amplitude. From this it follows that every elementary sound has a period of minimum intensity, answering to the wave's minimum amplitude when it is just beginning to rise; secondly, a period of maximum intensity answering to the wave's maximum amplitude when it has risen to its greatest height; and, thirdly, a period of minimum intensity, answering to the wave's minimum an
when it has sunk nearly to the level again; '
these minima and the maximum there are
degrees of loudness. In other words, e

sound is at first faint, then gradually becomes loud, then grows fainter, till it disappears. Now, note what happens when elementary sounds are made to succeed each other. If the succession be irregular, there is a mere chaos of noises—a case with which we need not here deal. But if the succession be regular, and steadily increase in rapidity, there follows a remarkable series of results. As long as the waves or pulses answering to the elementary sounds succeed each other slowly, the sounds are distinguishable from each other as raps or puffs, according to the instrument employed, and each has its maximum and its two minima of intensity. But, when the waves begin to strike the ear at the rate of about sixteen in a second, the consciousness of separate raps or puffs becomes evanescent, and there arises the consciousness of a continuous tone of very low pitch. That the consciousness of the separate sounds has not quite ceased, and that the continuousness of the tone which they compose is not complete, are shown by the fact that the maxima and minima are still perceived. In the deepest bass-notes of an organ, for example, the pulsations are clearly distinguishable —a fact which proves that we are conscious of the effects answering respectively to the protuberances and to the hollows of the waves. Now, the pitch of a tone depends upon the rapidity with which the waves succeed each other, and, therefore, upon their length, or the distance between two successive hollows, because as the waves come faster they grow shorter. The shorter the waves, the higher the pitch. Hence, as the pitch rises, the protuberance of any wave approaches nearer and nearer to the protuberances of the waves immediately behind it and in front of it, and the maximum intensities of sound which answer to the protuberances become crowded together in consciousness. The result is that, after a while, the maxima and minima are no longer distinguishable by the ear, so that by no effort of attention can we discern the elementary pulses of which the tone is composed. The tone asserts itself to be completely homogeneous. All that mere introspection could discover in consciousness would be an apparently simple sensation of musical tone. Yet into the composition of this sensat there enter a thousand or several thousand psychical state answering to the presence of as many elementary sounds with their maxima and minima of intensity. And if any one of these elementary sub-conscious psychical states were absent, the character of the conscious sensation would be different from what it is.

But this is not all. Every musical tone has a *timbre* or quality of its own, according as it proceeds from a piano, a violin, a flute, or any other instrument. Now, Helmholtz has proved that the quality of any tone is due solely to the number and combinations of certain higher and fainter tones which accompany it. Along with the fundamental note there are heard sundry harmonic notes, due to vibrations from two to ten times more rapid than those which constitute the fundamental note. When any note is sounded on the piano, the first six harmonics are sounded with it; when the same note is sounded on the violin, by means of the bow, the first six harmonics are sounded so feebly as to be overpowered by the seventh, eighth, ninth, and tenth; and this is the only cause of the difference in quality of tone between the piano and the violin. Now, by an effort of attention these harmonic over-tones may be recognized as distinct sensations when two or three notes are slowly struck. But in ordinarily rapid playing they are not distinctly recognized. Their only effect is to impart to the tones that peculiar quality which enables the ear to recognize the instrument from which they emanate. Thus our apparently simple sensations of musical sound are enormously complex. When F-*in-alt* is sounded on the violin, there are produced, in the course of a single second, several thousand psychical states which together make up the sensation of pitch, fifty-five times as many psychical states which together make up the sensation of quality, and an immense number of other psychical states which together make up the sensation of intensity. These psychical states are not, in any strict sense of the term, states of consciousness; for, if they were to rise individually into consciousness, the result would be an immense multitude of sensations, and not a single homogeneous sensation. There is no alternative, therefore, but to conclude that in this case a seemingly simple state of consciousness is in reality compounded of an immense multitude of sub-conscious psychical changes.

Returning, now, to what we have called the elementary sound, by the manifold compounding of which all cognizable tones, qualities, and intensities are built up, we shall the more readily yield to the evidence which shows that even this primitive unit of sound is not elementary. For, as M. Taine observes, each so-called elementary sound, in passing from its minimum to its maximum, passes through an infinite series of degrees of intensity, and, unless there were some psychical modification corresponding to each increment of intensity, there would be no state of consciousness answering to the total rise from the minimum to the maximum. Again, while, for simplicity's sake, we have assumed that each of the raps or puffs which occur too slowly to be heard as a single tone of lowest pitch is heard by itself as an elementary sensation, this is not strictly true. For the so-called simple sensation must be either a sensation of musical tone or a sensation of noise. In the former case its composite character has been already shown. In the latter case, in the sensation of noise, rap, or puff, the truly primitive elements are sub-conscious psychical states answering to successive waves of unequal lengths. Any one of these waves by itself will not produce a genuine state of consciousness; it is only by compounding the sub-conscious psychical affections which they severally produce, that we obtain the co-called elementary sensation of noise or rap.

In every way, therefore, the conclusion is forced upo
that every one of our apparently simple auditory sensa
is made up of a vast multitude of psychical affection
which the really simple ones would never rise into c
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cognizable sensation of sound is in reality a compound
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In the case of visual sensations, the same co
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pounded, that all the lines in the spectrum are si
harmonic overtones of a fundamental colour, which,
couple of octaves below red, is itself invisible. Restricting our statement to ascertained points of resemblance, it may be said that the argument from the phenomena of musical pitch applies step by step to the phenomena of colour as we rise in the scale from red to violet; the only difference being that, as the slowest vibrations which the eye receives occur at the rate of about 458,000,000,000,000 in a second, we cannot experimentally distinguish, as in the case of the lowest sounds, the seemingly elementary sensation which answers to each couple of vibrations. Nevertheless, from experiments with the electric spark it has been shown that a sensation of light which endures for one second is composed of at least a million successive sensations, each one of which, if separately excited, would rise into consciousness and be recognized as a flash of light. Now, as this flash of electric light is cognized as white, it follows that the cognizable sensation

which lasts for one-millionth of a second is really made up of at least three sub-conscious psychical states, which, if they were severally to rise into consciousness, would be severally cognized as red, green, and violet flashes—these being the primitive elements of which the consciousness of white light is composed. This fact alone shows that the method by which a sensation is formed out of sub-conscious psychical changes is essentially the same in the eye and in the ear.

No such elaborate investigations have been made with reference to the other peripheral sensations. Yet, in the cases of smell and taste, the argument is not essentially different from what it is in the cases of hearing and vision. The physical antecedent, either of smell or taste, is a chemical reaction between particles of the odorous or sapid substance, and the ends of the olfactory or gustatory nerve-fibrils. Now, a chemical reaction implies an enormous number of undulatory movements by which myriads of molecules are seeking to reach a position of equilibrium. Accordingly, the end of the nerve-fibrils in the olfactory chamber or in the tongue must be rapidly smitten by little molecular waves, just as the auditory filaments are smitten by atmospheric waves; and thus there is indicated a course of argument similar to that employed in the case of sound. It may be fairly argued that if each wave does not produce some sub-conscious psychical effect, the sum of the waves will not produce a state of consciousness known as smell or taste; so that here too the seemingly primitive sensation is really derivative and compound.

M. Taine's argument with reference to the tactile sensations is singularly beautiful, but no room is left for more than the briefest allusion to a few of its salient points. All tactile sensations are either dermal or muscular; that is, they are due, either to disturbances of nerve-fibrils embedded in the skin, or to disturbances of nerve-fibrils embedded in the extremities of the muscles lying under the skin. In the first case, the sensation is either of contact or of temperature; in the second case, there is a sensation of resistance or pressure; and in both cases, when the sensation proper to the nerve is prolonged or intensified beyond a certain degree, it is at first accompanied and finally supplanted by a sensation of pain. Now, Weber's experiments have shown that these differences in sensation are not due to the excitation of distinct nerves, but to the differently-combined excitation of the filaments of the same nerves. The difference between the sensation of contact and the sensation of temperature depends upon the order in which the filaments of a particular nerve are set in vibration. And thus, as Fick observes, we may understand why it is difficult to distinguish between a prick from a needle and a minute burn from a spark of fire; for the nearer we approach to a truly elementary sensation, the more evanescent becomes the distinction between the compound sensation of temperature and that of mechanical contact. On the contrary, when a larger area of skin is suddenly rubbed or burnt, so that enough nerves are brought into play to compound the elements of the sensations, then there is no difficulty in distinguishing the feeling of temperature from that of mechanical contact. From these and many other kindred facts, to which scanty justice is done by this cursory allusion, M. Taine very plausibly concludes that our ordinary tactile sensations are made up of little component psychical affections differing only in number, order, and duration; while, according as these elementary psychical states are differently compounded, they form conscious sensations which, as presented to consciousness, seem to be severally simple and distinct in kind.

Throughout this remarkable analysis questions are suggested which can be completely answered only when physics and chemistry, as well as physiology and psychology, are much more advanced than at present. Yet there are three important principles which we may regard as established in the case of sound, and as clearly indicated in the case of the other sensations. The *first* is, that sensations which are apparently simple and elementary, and which cannot be analyzed by mere observation of consciousness, are nevertheless compounded of many successive and simultaneous sensations, which are themselves compounded of still lower psychical affections. The *second* is, that two sensations, which differ only in the mode in which their elements are compounded, may appear in consciousness as generically different and irreducible to each other. The *third* is, that two or more psychical affections which, taken separately, are as non-existent to consciousness, may, nevertheless, when taken together, coalesce into a sensation which is present to consciousness. And when these three conclusions are presented in a single statement, they become equivalent to the conclusion above obtained from examining the beginnings of conscious intelligence in an infant; namely, that states of consciousness may be produced by the differential grouping or compounding of psychical states which are beneath consciousness.

This result is in entire harmony with what might be inferred *à priori* from the known characteristics of nerve-action. Whether in the grey substance of ganglia, or in the white substance of nerve-fibres, the physical action which accompanies psychical changes is an undulatory displacement of molecules resulting in myriads of little waves or pulses of movement. From this fact we might have suspected that, as a cognizable state of consciousness is attended by the transmission of a number of little waves from one nerve-cell to another, so the ultimate psychical elements of each conscious state must correspond to the passage of these little waves taken one by one. And this inference, which by itself would be only a plausible guess, is raised to the rank of a scientific hypothesis by its harmony with the results of the analysis above sketched.

Thus we are led to infer, as the ultimate unit [illegible]

Mind is composed, a simple *psychical shock*, answering to that simple *physical pulsation* which is the ultimate unit of nervous action. By the manifold and diverse compounding of myriads of such primitive psychical shocks, according to the slight structural differences of different nerves, are formed innumerable elementary sensations, which appear to be generally different; just as aquafortis and laughing-gas, which seem generically different, yet differ really only in the proportions of nitrogen and oxygen which compose them. By a similar differential compounding of these elementary sensations, we get complex sensations of blueness and redness, warmth, pressure, sweetness, roughness, and of various kinds of *timbre* and degrees of pitch. Carrying still farther the same process of differentiation and integration, we rise step by step to perceptions of greater and greater complexity, to conscious classifications, and to reasoning in its various forms, from the crude inferences of the child, barbarian, or boor, to the subtle and indirect combinations of the artist and the scientific discoverer. Thus, amid all their endless diversities, we discern, though dimly, a fundamental *unity of composition* throughout all orders of psychical activity, from the highest to the lowest.

Near the close of his first edition of the "Origin of Species," Mr. Darwin predicted that the establishment of his theory would eventually place the science of psychology upon a new basis—that of the acquirement of each mental faculty by slow gradations.[1] We seem now to have fairly started upon the path which leads to this desired goal. For, while, among the mental operations above analyzed, some are peculiar to the highest [illegible] there are others which are shared by the [illegible] human intelligence. Others—as the simplest inferences, several complex perceptions, and all the most simple ones—are shared by all human intelligence with the intelligence of apes, dogs, horses, and indeed of the majority of mammals, many birds, and possibly some lower animals. Others, again—as the simplest perceptive acts implied in recognizing a sensation—must be shared with all those animals whose nervous system is sufficiently complex to allow of their having any consciousness whatever. While others, finally—as the simplest sub-conscious groupings of primitive psychical shocks—must be shared by humanity with all those forms of animal existence which possess any nervous structure whatever. For instance, that reflex action which occurs when the foot of a sleeping person, casually moved into a cold part of the bed, is quickly withdrawn without arousing any state of consciousness, involves the activity of a fragment of the human nervous system which corresponds in general structure to the entire nervous system of a medusa or jelly-fish. In such lowly creatures, then, we must suppose that the psychical actions which go on are similar to our own sub-conscious psychical actions. And, clearly, if we could trace the slow increments by which the nervous system has grown in heterogeneity, definiteness, and coherence, during the countless ages which have witnessed the progress from the primeval marine vertebrate to the civilized modern man, we should also be able to trace the myriad stages of the composition of mind, from the reflex contractions of a rudimentary fin, up to the generalizations of an Aristotle or a Newton.

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[1] Mr. Darwin has since recognized [illegible] laid by Mr. Spencer. See *Origin of* [illegible] the "Principles of Psychology," upon [illegible] almost entirely founded, was first published in [illegible] "Origin of Species."

CHAPTER XVI.

THE EVOLUTION OF MIND.

THAT the amount of intelligence manifested by any vertebrate animal depends to a certain extent upon the amount of nerve-tissue integrated in its cephalic ganglia, and especially in the cerebrum, is a truth familiar to everyone, though often crudely stated and incorrectly interpreted. In the lowest vertebrate, the amphioxus, there is no brain at all. In fishes, the cerebrum and cerebellum are much smaller than the optic lobes; the cerebrum being in many large fishes about the size of a pea, though in the shark it reaches the size of a plum. Continuing to grow by the addition of concentric layers at the surface, the cerebrum becomes somewhat larger in birds and in the lower mammals. It gradually covers up the optic lobes, and extends backwards as we pass to higher mammalian forms, until in the anthropoid apes and in man it covers the whole upper surface of the cerebellum. In these highest animals it begins also to extend forwards. In the chimpanzee and gorilla the anterior portion of the cerebrum is larger than in inferior mammals; but in these animals, as in the lowest races of men, the frontal extension is but slight and the forehead is both low and narrow. In civilized man the [illegible] portion of the cerebrum is greatly extended [illegible] and laterally. As already observed the [illegible] physiological feature of human progress has [illegible] of the cerebrum. The cranial [illegible] pean exceeds that of the Australians and Bushmen by nearly forty cubic inches; and the expansion is chiefly in the upper and anterior portions.

But this parallelism between increased intelligence and increased size of the cerebrum is complicated by a further parallelism between the amount of intelligence and the irregular creasing and furrowing of the cerebral surface. In the higher mammals both the cerebrum and the cerebellum are convoluted. But the convolutions do not correspond with any "bumps," real or imaginary, on the external surface of the skull; they are not symmetrical on opposite sides, like the fancied "organs" of the phrenologists; nor indeed, so far as the general brain-surface is concerned, do they constitute elevations and depressions at all. The surface of the brain does not resemble a group of hills and valleys, but rather a perfectly smooth table-land cut here and there by very steep and narrow chasms. A perfectly smooth lump of butter, irregularly furrowed by a sharp knife held perpendicularly, would present a surface like that of the human brain. Now the amount of intelligence depends in some way on the number and irregularity of these furrows. In the lowest monadelphian mammals, as the rodents and the lowest monkeys, there are no furrows, or only a few very shallow ones. In the carnivora and ungulata, there are numerous furrows, some of them tolerably deep, but all of them symmetrically arranged. As we proceed to the higher apes, we find the furrows increasing in number and depth, though not yet losing their symmetry of arrangement. Idiots, young children, and adult savages have these creases few and regular; and in the lower races their arrangement is similar in different individuals. But in civilized man the creases are very numerous, deep and irregular; and they are not alike in any two individuals.[1]

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[1] Phrenologists have done good service by familiarizing the unlearned public with the fact that the quantity of mental capacity is related to the

The convolutions into which the human brain is divided by these furrows, consist for the most part of "eight distinct and concentric layers, formed chiefly of closely-packed fibres, and of crowds of cells of very different shapes, the layers differing in the relative proportion of cells and fibres, and in the manner of their arrangement."[1] Each cell sends forth processes with which the tissue of certain fibres becomes continuous. The office of the fibres is to establish communication between the cells. Between millions of these cells there run millions of fibres, establishing communications in all directions. And the elaborate researches of Schroeder van der Kolk have gone far to prove that the shapes of the cells and the intricacy of their communications vary with the amount of intelligence. In various forms of mental disease, both cells and fibres undergo pathological changes, such as atrophy, hardening, softening, or some other form of degeneration. That is to say, not only are the activities of the cells impeded, but the channels of communication are variously obliterated or blocked up.

quantity of brain. But the character of this relationship is seriously misinterpreted both by phrenologists and by the rest of the unlearned public. It is impossible to say that a man with an unusually large head must be a man of unusual mental capacity, because the quantity of mental capacity depends on many other factors besides quantity of brain. It not only depends upon the sinuous creasing of the brain-surface here described, which can in nowise be detected by an examination of the outside of the head, but it also depends largely, as Mr. Lewes well reminds us, upon the very important element of vascular irrigation. "Many individual variations in mental character depend on the variations in the calibre of the cerebral and carotid trunks—and many variations in the intellectual, emotive, and active tendencies depend on the *relative* importance of the cerebral and carotid trunks. The *energy* of the brain depends mainly on the *calibre* of its arteries; the special *directions* of that energy depend on the *territorial distribution*."—*Problems of Life and Mind*, vol. i. p. 151. Again, the quantity of available mental energy which can be evolved in a given period of time, depends, to a very great extent, upon the efficiency with which the blood is supplied with oxygen and freed from carbonic acid; so that mental capacity not only depends upon capacity of brain, but also upon capacity of lungs and liver. In short, a thorough examination shows that while Mind is most directly correlated with Brain, it is indirectly but closely correlated with the entire organism. So that the attempt to estimate individual differences of mental capacity by referring to brain-size alone, is an utter absurdity.

[1] Maudsley, *Physiology and Pathology of Mind*, p. 55.

Between these fibres and cells there are differences of molecular structure implying differences in molecular activity. While the matter composing a cell is built up in enormously complex aggregates of molecules, wholly unshielded from external disturbance, the nerve-matter of a fibre is protected throughout its entire length by a membranous sheath. And while it is probable that the action going on in a cell consists in the continual fall of unstably arranged molecules into a state of more stable equilibrium, from which a fresh rush of blood is continually raising them to their former unstable state; it is probable that the action going on in a fibre consists in the successive isomeric transformations and retransformations of the systems of molecules which make up the fibre. These conclusions are quite probable, though not proven. But it is entirely proved that a cell is a place where nervous energy is liberated, while a fibre is a path along which nervous energy is transmitted.

Bearing all this in mind, it appears that the cerebrum and cerebellum are places where countless centres are constantly liberating nervous energy, and where this liberated energy is continually flowing along definite channels and from one centre to another. But to make the statement complete, we should add that much of the liberated energy is drafted off along centrifugal fibres into the corpora striata, whence it flows into the medulla and spinal centres, and is thus diffused over the body. Omitting the further consideration of these circumstances, let us inquire into the meaning of this unceasing interchange of molecular motion between the innumerable cells crowded together in the cerebrum and cerebellum. In other words, what are the functions of these supreme ganglia?

That their functions are not in any degree the direct coordination of sensations and movements, would appear from the fact that these direct coordinations are already made in the spinal cord and in the medulla. All the muscular adjust ments made in the trunk and limbs are effected either directly by the spinal centres, or indirectly by the sympathetic ganglia in cooperation with the spinal centres. The medulla coordinates all these muscular adjustments with the muscular adjustments of the face, and with the impressions received from the specialized organs of sense. It is therefore highly improbable that the supreme ganglia can be in any way directly concerned with these coordinations. And the improbability is increased by the fact that the cerebrum and cerebellum are as destitute of sensation as the free ends of the finger-nails. Scratch one of the spinal centres, and the result is tetanus. Scratch the medulla, and the whole body is thrown into terrible convulsions. But the cerebrum and cerebellum may be scratched and sliced without pain or convulsion. They take heed only of those impressions which are communicated to them indirectly. Countless multitudes of nerve-fibres coming up from the medulla, are gathered together in the corpora striata; whence other fibres, continuing from them, radiate to the innumerable cells of which the supreme ganglia are composed.

We must conclude, therefore, that the functions of the cerebrum and cerebellum are comprised in the further compounding of sensory impressions already compounded in the medulla. And as such compounding involves the reproduction of impressions received in lower centres, and also involves the coordination of past with present impressions, we may say that the supreme ganglia are the seats of the higher psychical life,—of memory, reason, emotion, and volition. Dr. Maudsley has thus appropriately termed them the *ideational* centres. But between the functions of the two, thus closely related, there is nevertheless a difference. Although the precise determination of the way in which ideational functions [illegible] shared between the two centres, has long remained [illegible] problem, there is good reason for [illegible] has solved the difficulty by assigning to the cerebellum the office of doubly-compound coordination in space, and to the cerebrum the office of doubly-compound coordination in time. The facts of comparative anatomy, and of comparative psychology, so far as known, are in harmony with this opinion. We saw in the chapter on Life and Mind that the extension of the correspondence in time at first goes on parallel with the extension of the correspondence in space; the increased area over which the organism can act being the measure of its increased capacity for adapting its actions to longer and longer sequences in the environment. But we saw also that in the human race the extension of the correspondence in time has gone on far more rapidly than the extension in space; the most striking characteristic of intellectual progress being the ability of civilized man to adapt his inferences and actions to remote contingencies. Side by side with these facts, comparative anatomy shows us that the cerebrum and cerebellum at first keep pace with each other in growth; but, as we reach those higher mammals which exhibit some degree of foresight, we find the cerebrum outgrowing the cerebellum and overlapping it; while in man the growth of the cerebrum has been so great as to render comparatively insignificant all other changes in the nervous system. With the enormous cerebrum of civilized man we may further contrast the preponderant cerebellum in those carnivorous birds whose psychical life consists chiefly in the coordination of those extremely complex and remote space-relations involved in the swooping upon prey from great distances. The human cerebellum is absolutely larger than that of such birds; but its smallness relatively to the cerebrum is a fact parallel with the simplicity of the space-relations which man coordinates, as compared with the time-relations. Among the latter are comprised all our ideas of cause, motion, progress,—in a word, all manifestations of force which involve the relation of sequence. But these ideas make up by far the largest and most heterogeneous portion of our psychical life.

I am inclined to regard these considerations as very powerful ones,—and there are several others which lead to the same conclusion. To present the case properly would require a whole chapter; but it is not essential for our present purpose that the question should be decided. Whether Mr. Spencer's view of the respective functions of the cerebrum and cerebellum be correct or not, it equally remains true that the class of functions shared by the two are ideational functions. They compound in double, triple, quadruple, or in far higher multiples, the sensory elements already simply compounded by the medulla. And it is in this compound grouping of impressions, past and present, according to their various degrees of likeness and unlikeness, that thought and emotion, the highest phases of psychical life, consist.

A moment ago we asked, what is the meaning of the ceaseless interchange of molecular motion which goes on among the innumerable cells of the brain? We now see what is the meaning of it, for there can be but one meaning. The continual redistribution of nervous energy among the cells, is the objective side of the process of which the subjective side is the recompounding of impressions. If we may for a moment unduly simplify the matter, it may be said that for every renewed grouping of impressions, for every revived association of ideas, there is a nervous discharge between two or more cells, along formerly-used sets of transit-fibres; and for every fresh grouping of impressions, for every new connection of ideas, there is a discharge along new transit lines. In reality the matter cannot be so simple as this, since, as we shall presently see, the maintenance of consciousness [illegible] of tension between many simultaneous discharges. But however great the complexity, the [illegible]

If it be objected to this view that it obliges us to assume a vast amount of differentiation and integration in the brain, during the lifetime of single individuals, it may be replied that the assumption is fully sustained, both by sound deduction and by observation. Not only does the brain increase in size and heterogeneity during the first twenty-five years of life, but ordinarily it increases in heterogeneity, and often in size, for many years later; and in some cases it increases in heterogeneity until the end of life. The brain of a young child is in homogeneity like the brain of an ape; the furrows are shallow, symmetrical, and few in number. With advancing years they increase in number, depth, and irregularity; and the increase is most marked in those persons who do the most brain-work. In the brains of five very eminent men examined by Wagner, the heterogeneity of surface is described as quite astonishing. Such facts prove that the operations of thought work strongly-marked structural changes in individual brains, in the course of a few years. And as these strongly-marked changes are but the summing-up of countless little changes in the arrangements of cells and fibres, the inference is inevitable that such little changes must be going on all the time. This is the testimony of observation, and deduction might have taught us to expect as much; since the molecules of nerve-tissue are chemically by far the most unstable molecules known to science, ever ready to undergo metamorphosis and arrange themselves in new groups. Waste and repair go on more rapidly in the brain than in any other part of the body; the cerebrum, weighing between three and four pounds, receives at each pulsation one-fifth of all the blood sent from the heart, and if the supply is stopped for an instant, consciousness ceases. Where nutritive change is so excessively rapid, such structural changes as are involved in the continual setting-up of new transit-lines, must be readily effected. And quite in harmony with this course of inference is the fact that, when cerebral nutrition is notably retarded, as by the anæmia and feeble circulation of disease or old age, new associations of ideas become difficult or even impossible.

To sum up this whole preliminary argument:—the cerebrum and cerebellum are organs whose function is ideation or the generation of ideal feelings and thoughts. They are organs made up of a tissue in which chemical changes occur with unparalleled rapidity. We cannot see these changes go on, but we can equally well infer their general character when we have examined the chemical properties and molecular structure of the tissue in which they occur. Microscopic and chemical examination of this tissue shows that these chemical changes must consist in a perpetual transfer of energy from one cell to another along transit-lines composed of nerve-threads. Bear in mind that the cell does not average more than one ten-thousandth of an inch in diameter, and that the quantity of matter contained in a transit-line is almost infinitely small. Now since the cerebrum and cerebellum are, subjectively speaking, places where ideation is continually going on; and since they are, objectively speaking, places where nerve-cells are continually sending undulations back and forth along transit-lines; the inference seems forced upon us, that the transfer of an undulation from one cell to another is the objective accompaniment of each subjective unit of feeling of which thoughts and emotions are made up. And if this be so, it becomes a mere truism to say that the formation of a new association involves the establishment of a new transit-line, or set of transit-lines, while the revival of an old association involves merely the recurrence of motion along old transit-lines. That this is merely a hypothesis, I readily grant. Nevertheless it is a verifiable hypothesis; it is in harmony with all that we know of nerve-action; and it may be held provisionally until some better one is [illegible]. When we proceed to see how many [illegible] we shall be, I think, quite ready to admit that, if it does not contain the whole truth, it must at least contain a foreshadowing of the truth.

For we have now to note that, by a deduction from an established law of molecular motion, this hypothetical law of nervous action can be shown to explain that law of association which subjective analysis proclaims as the fundamental law of intelligence. In the chapter on Life and Mind, we saw that the chief business of psychology is to answer the question how there comes to be established in the mind a relation between two subjective states X and Y, answering to a relation between two phenomena A and B in the environment. How is it that there is a subjective relation between the idea of sweetness and the group of ideas comprised in the visual perception of a peach, answering in some way to the objective relation between the coexistent properties of the peach, so that the presentation of the one to the cephalic ganglia is inevitably accompanied by the representation of the other? This question lies at the bottom of psychology, and we have now to see how it is to be answered. The answer will lead us through a portion of the domain of molecular physics, and will incidentally give us a hint concerning the genesis of nervous systems.

In the chapter on Matter, Motion, and Force, it was shown that all motion takes place along the line of least resistance, whether the motion be the movement of a mass of matter through a resisting medium, or the passage of a series of undulations through the molecules of an aggregate. Let us reconsider this truth in one of its concrete applications.

When a wave of molecular motion traverses a mass of matter for the first time, the line of least resistance will of course be determined by the intimate structure of the mass. But now mark what happens. Immediately after the passage of the wave, the intimate structure of the mass, in the vicinity of the line along which the wave has travelled, is different from what it was a moment ago. The passage of the wave has pushed a linear series of molecules out of position, and a short time must elapse before these molecules can return to their positions. Therefore if the first wave is instantly followed by a second, starting from the same point, the line already traversed will be the line of least resistance, even more decidedly than before. The second wave will encounter less resistance than the first wave, because it will find its work of altering the positions of the molecules already partly done for it. Thus, according to the molecular mobility of the matter in question, the transit of succeeding waves, along the line once established, will rapidly become less and less hindered. And the process must go on either until the inertia of the molecules along the transit-line opposes a minimum of resistance to the passage of the wave, or even until the energy given out by the molecules in changing position adds to the momentum of the wave. In either case there is established a permanent line of least resistance, along which all subsequent waves that start from the same point must travel. The most familiar illustration of this process is afforded by the facts of magnetization, which show "that the establishment of undulations along certain lines determines their continuance along those lines."[1] The case of liquid matter flowing through solid matter—as when currents of rain-water, percolating through loose soil, gradually break away obstructing particles and excavate small channels which ultimately widen and deepen into river-beds—is a case in which similar dynamic principles are involved. In all these cases, "if we confine our attention to that part of the motion which escaping transformation continues its course, then it is a corollary from the persistence of force that as much of this remaining motion as is taken up in changing the positions of the units, must leave these by so much less able to obstruct subsequent motion in the same direction."[1]

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[1] An illustration of this principle is perhaps to be found in the mellowing of old violins. According to Prof. Tyndall, "the very act of playing has a beneficial influence; apparently constraining the molecules of the wood, which in the first instance were refractory, to conform at last to the requirements of the vibrating strings."—*Sound*, p. 90. As Dr. Maudsley would say, [illegible] molecular structure of the wood.

Now in the case of organic bodies, the enormously complex molecular changes involved in nutrition are such as to aid in the setting-up of the most perfect transit-lines. In an inorganic mass the molecules have comparatively little mobility, and they do not leave their connections from moment to moment, to be instantly replaced by new molecules. But the complex clusters of molecules which make up living tissue possess immense mobility, and they are continually falling to pieces and getting built up again. Consequently the repeated passage of waves either of fluid matter or of molecular motion along a definite line of least resistance, not only changes the positions of the molecular clusters, but also modifies the nutritive changes by which the temporary equilibrium of the clusters is restored. Instead of a set of relatively homogeneous molecules, which are simply pushed aside and then tend to oscillate back again, the advancing wave encounters a heterogeneous edifice of molecules, which tumbles to pieces and is instantly rebuilt. But in the rebuilding the force exerted by the advancing wave has to be expended; and the result is that in the rebuilt cluster there is a surplus tension exerted in the very direction in which the waves are travelling. The transit-lines thus become far more permeable than any which can be established in inorganic bodies. The energy given out by the decomposing cluster of molecules adds to the momentum of the wave; so that the line of least resistance becomes to a certain extent a line of traction. A good illustration is afforded by the gradual evolution of the circulatory system as we ascend in the animal scale. In the lowest animals which possess any nutritive fluid perceptibly distinct from the protoplasmic jelly of which their bodies are composed, this fluid percolates here and there at seeming random, its course being determined by local pressures, just as in the case of rain-water trickling through the ground. Now as we ascend to higher animals, we find that the nutritive fluid has wrought for itself certain channels, to which it confines itself, and which gradually become more and more definite in direction, and more and more clearly demarcated from the adjacent portions of tissue. Until, when we reach animals of a high type of structure, w find the blood coursing through permanent channels, t walls of which contract and expand in such a way as assist the blood in its progress. A similar explanation is to be given of the genesis of the contractile fibres of muscle as due to the continuance of molecular undulations al certain lines.

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[1] Spencer, *First Principles*, p. 248. Thus, though Mr. Mill is justified in saying (*Inaugural Discourse*, p. 62) that "physiology is the first science in which we [distinctly] recognize the influence of habit—the tendency of something to happen again merely because it has happened before"—yet, as we here see, the phenomena of habit are foreshadowed in the inorganic world. An admirable instance of that continuity among phenomena which is everywhere implied by the theory of evolution.

When we come to the nervous system, we find most completely realized all the conditions requisite for the rapid establishment of permanent transit-lines. The clusters of molecules of which nerve-tissue is composed, are more heterogeneously compounded than any other known systems of molecules; and the alternate pulling to pieces and putting together of these clusters, which we call nutrition, goes on here with unparalleled rapidity. Of all known substances, nerve is the most changeable, the most impressible, the most readily adaptable to changing combinations of incident forces,—in short, the most easily differentiable and integrable. Hence we find that those long transit-lines, known as afferent and efferent nerves, are not only so constituted that a wave of disturbance set up at one end is immensely increased before it reaches the other end, but are also protected by enveloping clusters of molecules in such a way that none of the transmitted motion is allowed to escape laterally. Ease of transit is here witnessed at its maximum.

Making use of these theorems of transcendental physics, and applying to the problem his vast and accurate knowledge of biological details, Mr. Spencer has propounded a theory of the genesis of nervous systems of all orders of complexity, which, whether entirely or only partially true, must be regarded as one of his most brilliant achievements. In the lately-published "Physical Synthesis," which concludes the first volume of his "Principles of Psychology," Mr. Spencer shows that the irritability which characterizes the entire surface of the lowest animals, and which probably consists in the isomeric transformation of colloidal clusters of molecules distributed over the surface, must gradually become concentrated in certain definite transit-lines, just as the circulation of a nutritive fluid becomes confined to certain channels : while the collision of waves which takes place wherever two or more of these transit-fibres inosculate, must result in such chemical changes, and in the gradual formation of such a structure, as characterize nerve-centres. But the exposition, when carried into details, is altogether too abstruse to be profitably presented here, nor is it necessary for our present purpose. The explanation of the laws of association only requires that, starting with some kind of nervous system as already established, we should examine the character of the nutritive changes set up within it by environing agencies.

The foregoing argument shows us that the most prominent characteristic of such changes is the formation of transit-lines between neighbouring cells; and we have seen that the more frequently a wave of molecular disturbance passes along any such transit-line, the more easily will it pass, and the more difficult will it be to divert it into any other transit-line. Hence in any complex aggregate of cells and fibres, like the human brain, we may expect to find a countless number of transit-lines, of all degrees of permeability. Those which have been oftenest traversed will be the most permeable, and those which are traversed only at rare intervals will be but slightly permeable; while the passage of a nervous discharge in a new direction will involve the differentiation of a new line of transit.

Now subjective psychology furnishes us with an exact parallel to this state of things. The profound analysis of conscious changes carried on by the English school of psychology since the time of Hobbes, and accepted by the Kantian school in all save a few very important instances —which we shall presently see to be similarly explicable— has ended in the conclusion that states of consciousness cohere with a strength dependent upon the frequency with which they have been repeated in experience. In other words, "the persistence of the connection between states of consciousness is proportionate to the persistence of the connection between the agencies to which they answer. This fundamental law of association is illustrated by such familiar truths as the following:—" that phenomena wholly unrelated in our experience, we have no tendency to think of together; that where a certain phenomenon has occurred in many relations, we usually imagine it as recurring in the relation in which it has most frequently occurred; that when we have witnessed many recurrences of a certain relation we come to have a strong belief in that relation; that if a relation has been daily experienced throughout life with scarcely an exception, it becomes difficult for us to conceive it as otherwise—to break the connection between the states of consciousness representing it; and that where a relation has been perpetually repeated in our experience with absolute uniformity, we are entirely disabled from conceiving the negation of it."[1]

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[1] Spencer, *Principles of Psychology*, vol. i. p. 421

The correspondence between the subjective and the objective sides of the phenomena is thus complete, and the increasing complication of cell and fibre in the brain, from infancy to old age, is seen to have a psychological meaning. If the acquisition of a new idea is attended by the passage of a wave of molecular motion along a new path; and if recollection is a state of consciousness attending the transmission of a later wave along the same path; we have an adequate physical interpretation of the fact that the repetition of an idea is favourable to the recollection of it. And we have also the physical interpretation of habit and prejudice. Molecular motions that have been repeatedly transmitted between particular groups of nerve-cells, end by establishing more or less intricate webs of transit-lines which cannot be obliterated. No effort can prevent their occasional recurrence along these lines, or establish a new plexus of transit-lines, involving the derangement of the old ones. Late in life, when the ratio of repair to waste is greatly diminished, when the nutrition of the cerebral tissue is impaired, when the pulling to pieces and putting together of molecular clusters in which nutrition consists goes on slowly, then the formation of new sets of transit-lines becomes especially difficult; and hence, as we say, the shaking off of old habits and prejudices, and the acquiring of new and strange ideas, is next to impossible. It is proverbially hard to teach an old dog new tricks. We may here also see why it is impossible to learn or to carry on complicated thinking when in a state of anæmia: the nutritive changes go on too slowly. Changes in memory further illustrate the theory. In youth, when the excess of repair over waste is at the maximum, but few discharges through any transit-fibre are needful in order to work a permanent nutritive change, setting up a line of communication which shall last through life: hence learning is easy and rapid, and memory is powerful. In old age, when waste is slightly in excess of repair, and both are at the minimum, a great many discharges are necessary for the achievement of any permanent nutritive change: hence learning is slow and difficult, and memory is feeble. And hence—what is most significant of all—the old man does not remember recent events, while he remembers very well what happened in his youth, when his rate of nutrition was rapid. These and countless similar facts show us that a state of consciousness and a nutritive change in the cephalic ganglia are correlated like the subjective and objective faces of the same thing. And thus are explained the many facts which in the seventh chapter were brought forward in illustration of the transformations of vital energy,—such as the facts that consciousness ceases the instant the carbonic acid in the blood has attained a certain ratio to the oxygen; that much thinking entails a great excretion of alkaline phosphates; and that prolonged mental exertion is followed by a bodily fatigue and a keen appetite not essentially different from the fatigue and hunger which follow muscular exercise.

Regarding it now as provisionally established that an association of ideas is dependent upon the formation of a transit-line between two nerve-cells, and that the more often the fibrous path is traversed the more indissoluble will be the association, let us proceed briefly to apply this doctrine to the explanation of sundry psychical phenomena. Now as we begin to examine the simplest psychical phenomena—those of reflex action and instinct—we are met by the seeming difficulty that indissolubly connected psychical states occur where the corresponding objective relation has *never* been repeated within the experience of the individual. Instinctive adjustments of inner to outer relations are apparently made without any help from experience. Moths and butterflies take to wing immediately on emerging from the envelope of the chrysalis; "a fly-catcher, immediately after its exit from the egg, has been known to peck at and capture an insect"; and "a young pointer will point at a covey the first time he is taken afield." But in such cases as these, where the cohesion of psychical states has not been determined by the experience of the individual, it has nevertheless been determined by the experience of the race. That the repetition of ancestral experiences must end in the automatic cohesion of psychical states, is both demonstrable *à priori* and illustrated by many facts. Birds living in islands uninhabited by men will not fly away when approached by travellers, having none of that instinctive fear which "continued experience of human enmity has wrought" in other birds. Yet in a few generations, these birds will acquire the same instinctive fear. In many cases the offspring of a dog that has been taught to beg will beg instinctively; and various peculiarities of demeanour, carefully impressed by education upon sporting dogs, are manifested without education by their descendants. Indeed it is familiar to breeders that the dispositions and instincts of domestic animals can be to a certain extent modified by training and selection, no less than their physical constitutions.[1]

The physical explanation of the automatic cohesion of psychical states implied in hereditary instinct, is not difficult at this stage of our inquiry. When the experience of many past generations has uniformly contributed to establish a certain arrangement of transit-lines in the chief ganglia of the animal, there must be a hereditary tendency for such transit-lines to develop by the mere process of nutrition. And where the psychical life is very simple, and but little varied from generation to generation, a nervous system embodying certain organized aptitudes will be transmitted as surely as the muscular or vascular system is transmitted Nervous discharges will run along pre-established transit-lines as inevitably as in human beings the nervous discharges which regulate the respiratory and alimentary movements run in permanent channels. The character of the process is best exemplified in *reflex action,* the simplest form of psychical life. In reflex action, which is unaccompanied by consciousness, a single inner relation is adjusted to a single outer relation. For the simpler kinds of reflex action nothing is needed but what is called a *nervous arc,*—that is, an afferent nerve, a ganglion, and an efferent nerve. When a person sound asleep draws away a limb that is touched, the impression is simply carried along an afferent nerve to one of the spinal ganglia, and thence reflected along an efferent nerve to the muscle which moves the limb. The assistance of the brain is not needed. In many animals the limbs thus respond to stimuli after the head has been cut off or the brain sliced away. This kind of psychical life, which is but one degree removed from purely physical life, is all that is manifested by those lowly-organized animals whose nervous system consist of simple arcs. So thoroughly physical is this group of phenomena that it may seem almost inappropriate to call it psychical: nevertheless it forms the transition from the one kind of life to the other. It is the lowly beginning from which higher forms of psychical activity arise.

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[1] "How strongly these domestic instincts, habits, and dispositions are inherited, and how curiously they become mingled, is well shown when different breeds of dogs are crossed. Thus it is known that a cross with a bull-dog has affected for many generations the courage and obstinacy of greyhounds; and a cross with a greyhound has given to a whole family of shepherd-dogs a tendency to hunt hares. These domestic instincts, when thus tested by crossing, resemble natural instincts, which in a like manner become curiously blended together, and for a long period exhibit traces of the instincts of either parent: for example Le Roy describes a dog, whose great-grandfather was a wolf, and this dog showed a trace of its wild parentage only in one way, by not coming in a straight line to his master, when called."—Darwin, *Origin of Species*, 6th edit., p. 210.

Now in reflex action, as it is exemplified alike in the rhythmical movements of our heart, lungs, stomach, and other viscera, and in the contraction of a polyp's tentacle when food comes against it, we see a series of nervous discharges which are automatically directed along certain definite transit-lines. The lines of least resistance have become permanently organized in the animal structure, and they are transmitted, with the accompanying capacities of action, from generation to generation. Here we see "indissolubly connected psychical states existing where there are perpetually repeated experiences of the external relations to which they answer."

The phenomena of *instinct* are more distinctly psychical than those of reflex action. "While simple reflex action is common to the internal visceral processes and to the processes of external adjustment, instinct is not. There are no instincts displayed by the kidneys, the lungs, the liver: they occur only among the actions of that nervo-muscular apparatus which is the agent of psychical life." Instinct, moreover, implies the coordination of a large number of stimuli with the answering movements, and herein is its chief difference from reflex action,—a difference in degree only. The newly-hatched fly-catcher, in seizing a fly, shows "an exact appreciation of distance, as well as a power of precisely regulating the muscular movements in accordance with it." The number of impressions and movements here coordinated is so considerable that it would take several pages to describe them thoroughly. Here certain systems of transit-lines, involved in the establishment of a correspondence in space, are wrought by nutrition in the animal's nervous system, so completely that when the outer relation occurs the discharge instantly takes place along the pre-established channels, and the adjustment is made. There is an intricate compounding of reflex actions, involving the assistance of the brain; for if the cerebellum be sliced, the fly-catching can no longer be performed. Intricate, however, as the combination is, it is a special and unvarying one which has been continually repeated during the whole lifetime of countless ancestral fly-catchers, so that there is nothing strange in the fact that it is completely organized at birth. The principle is the same as in the simpler phenomena of reflex action. Here, as before, extending the experience theory to the entire race, we see "indissolubly connected psychical states existing where there are perpetually repeated experiences of the external relations to which they answer."

Though the higher kinds of instinct, in which the supreme ganglia cooperate, are probably accompanied by a vague consciousness, yet in the main the processes which we have just described must be regarded as automatic. Let us now notice what must occur when the correspondence between inner and outer relations has become quite complex and special. As Mr. Spencer has pointed out, "phenomena become less frequent in proportion as they become more complex; and hence the experiences of them can never be so numerous as are the experiences of simple phenomena. The relation between a passing obscuration and a living body, recurs oftener than the relation between a certain degree of obscuration and danger, or than the relation between a certain other degree of obscuration and food. Again, each of these relations is more general than the relation between a particular size and form of visual impression and an object of a particular class. And again, this relation is more general than that between a particular size, form, and colour of visual impression, and a certain species of that class."[1] From this it follows that a lowly-organized animal, in which there is established a correspondence only with the most general environing relations, and which therefore has experience only of such most general relations, has at the same time a uniform experience which maintains a complete cohesion among its simple psychical states. On the other hand, a highly-organized animal, in which there are established correspondences with many complex and special relations, will have a varied experience, and at the same time a varying cohesion among its complex psychical states. While the most general relations which it experiences will [illegible] the most and while sundry special relations (as in the seizing of its prey by the fly-catcher) will be extremely frequent, there are many other special relations of which the experience will be much less frequent. And accordingly, along with the perfectly coherent psychical states generated by the former, there will be a congeries of less coherent psychical states generated by the latter. Or, to restate the case in physiological language:—While in the lower organism there will be a number of transit-lines permanently established, and scarcely any tendency toward the formation of new ones; on the other hand, in the higher organism, there will be a number of permanent transit-lines and a number of such lines in process of formation, along with a continual tendency toward the establishment of new ones. The consequences of this are obvious. In becoming more and more complex, the correspondences become less and less instantaneous and decided. "They gradually lose their distinctly automatic character, and that which we call Instinct merges into something higher."

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[1] Spencer, *Principles of Ps*[illegible]

For as long as the psychical life consists solely in the passage of nervous undulations along permanent pre-established channels, there is no consciousness. Consciousness, as already shown, implies continual discrimination, or the continual recognition of likenesses and differences; and this process implies a rapid succession of changes in the supreme ganglia. Now this rapid succession of changes occurs when a vast number of relations are brought together in a single ganglion, or group of ganglia, as in the cerebrum, in order to be compared with each other. Besides this, consciousness implies a certain lapse of time during which impressions persist; and there is no such persistence in reflex action, or in the lower forms of instinct, where the molecular dist[illegible] constituting a nervous impression is instantly dr[illegible] along the pre-established channels. Such persist[illegible] only when a number of impressions ar[illegible] a single ganglion, where an appreciable time must elapse before they are carried off each along its own set of transit-lines. For example, when you tickle or pinch the arm of a person asleep, the arm is at first withdrawn by simple reflex action: the ordinary channel, through the afferent nerve to the spinal centre and back again through the efferent nerve to the limb, suffices to carry off all the molecular disturbance,—and there is no consciousness of the irritation or of the resulting contraction. But if the pinching be frequently repeated, so that the disturbance is generated faster than it can be thus drafted off, the surplus is sent up through a centripetal fibre from the spinal ganglion to the brain; and some dreaming ensues, or perhaps a fretful sound is emitted. If the impression be kept up long enough, there is full consciousness of it, and the person awakes. Now the rise of consciousness implied in the dreaming and waking is due to the persistence in the cerebrum of a molecular disturbance which is not at once drafted off through the proper centrifugal fibres.

Obviously, therefore, when the number of impressions sent in to the brain from moment to moment exceeds the number of thoroughly permeable channels which have been formed there, so that there is a brief period of tension during which occur the nutritive changes implied in the transmission of the disturbance through the appropriate channels, then there arise the phenomena of conscious intelligence. For mark what must happen. In the *first* place, the persistence of the impressions enables them to be consciously felt, either pleasurably or painfully; so that there is the germ of Emotion. *Secondly*, the disturbance tends to propagate itself along various permeable transit-lines, so that there is a revived association of ideas, or what we call Memory. *Thirdly*, there is an integration of the present impressions with such past ones as they resemble, and a differentiation of them from such past ones as they do not resemble; and this comparison of present with past impressions, dependent on memory, implies classification, and is the germ of what we call Perception and Reasoning. *Fourthly*, there is, in the case of many kinds of impressions, a period of tension during which it becomes determined along what set of centrifugal fibres the surplus disturbance shall be drafted off, and here we have the primitive form of Volition. Thus the various phases of conscious psychical life—which we call emotion, memory, reason, and volition—arise as soon as there begins to elapse an appreciable time between the accumulation of molecular disturbance in a group of cephalic nerve-cells, and its discharge along the proper transit-fibres. And this state of things, which is not possible in simple nervous systems which only respond instinctively or by reflex action to a few general relations in the environment, becomes possible in those compound nervous systems which respond to a great number of infrequent and special relations. For the establishment of inner relations, answering to these infrequent and special outer relations, involves a lapse of time during which numerous diverse impressions are getting distributed through various transit-lines hitherto little used. When, as in the fully-developed human cerebrum, a vast number of infrequent and special relations are continually set up, there is a maximum of nutritive change, there is a maximum of time during which impressions simultaneously coming in may be compared and classified, and there is a maximum of consciousness.

This explanation of the way in which the various phases of conscious psychical life arise, is fully confirmed by the way in which they disappear when actions at first consciously performed become instinctive. The confirmation is so complete as to afford a very strong proof of the truth of the hypothesis. Many of the actions performed by civilized man are designated by psychologists as "[illegible]ndarily automatic." That is, they are at first perfor[illegible]h the assistance of reason, volition, and conscious memory, and they are attended by feelings of pleasure or pain. But after a while they are performed without the aid of reason, volition, or conscious memory, and they are not attended by pleasurable or painful feelings. In becoming instinctive, they lapse partially or entirely from consciousness. The child in learning to walk and talk, must will each movement and rationally coordinate it with other movements in order to attain the desired end. But the man, in walking and talking, is unconscious of the separate movements, and volition serves only to set them going. In learning to read, the child must consciously remember each letter, combine it with others into a word, and associate the word with the thing signified; and this last process is repeated in later years when we learn foreign languages. But in reading our own language, or a foreign one which has been thoroughly learned, the association of words and things is automatic. In reading an English book, in which French quotations are inserted, one frequently passes from one language to the other and back again, without noticing the change, if the attention be concentrated on the subject-matter. In learning to play the piano, there is at first a vast amount of conscious association between the written notes, the key-board, and the muscular adjustments of the fingers, wrists, and arms; but an accomplished pianist will play a familiar piece while his attention is directed to other matters. The case is similar with writing, and indeed with all habitual actions which require nervo-muscular coordination. In many cases, moreover, the intervention of conscious attention only impairs the accuracy of adjustment. In billiard-playing and rifle-shooting, the aim is usually impaired if we stop to think about it; and on the piano it is almost impossible to play triple notes with one hand and [illegible] with the other if we attempt to measure [illegible]

Purely intellectual acts also become to a certain extent automatic with practice, as was indeed implied in some of the foregoing illustrations. Not only the combination of words into a sentence, but the combination of sentences into a proposition, and the combination of propositions into a theory, is effected more and more rapidly, until the process hardly attracts attention. In a complicated exposition like the present, numerous scientific theorems, at first laboriously comprehended one by one, are wrapped up together and thrown into some subordinate clause of a sentence, the total being so obvious as not to withdraw the attention from the main current of thought while writing. In such facts we have a partial explanation of many of the phenomena of what is called unconscious or "sub-conscious" thinking. And thus, too, are to be explained those sudden flashes of insight, scientific or poetical, which in early times were attributed to inspiration or dictation from without. Obviously without a good deal of such automatic acting and thinking, we could achieve but little in art or science. We should never become good pianists if we had to keep paying attention to all the requisite muscular adjustments; and science would advance but slowly if at each step of an intricate inquiry in dynamics it were necessary to stop and reflect upon the elementary laws of matter and motion.

The physical interpretation of these secondary automatic processes is not difficult, according to the hypothesis here expounded. During the process of learning, there is an extensive formation of new transit-lines, and consequently an appreciable interval between the accumulation of molecular disturbance in the cerebral cells and its discharge. Impressions persist long enough to be compared together, and accordingly there is reason and there is volition. Th[illegible] is a maximum of consciousness, because there is a m[illegible] duration of the nutritive changes, and hence w[illegible] follows; cerebral nutrition entailing greater waste than occurs in any other part of the system. But with constant repetition the resistance to the passage of undulations along the new transit-lines disappears entirely. Nutrition has so modified them that, as above explained, they become lines of traction instead of lines of resistance. As we say, nothing can prevent the one group of ideas or movements from following the other. The discharges are made instantly, and along with a minimum duration of nutritive change there is a minimum of consciousness. The combinations become permanently organized in the brain-structure, and in becoming permanently organized they become instinctive or automatic.

We may now also begin to understand why it is that in man the organization of instincts, primary and secondary, is continued through the early years of life, while in the other animals the majority of the instincts are already organized at birth. The distinction is not an absolute one, as many of the higher vertebrates, both birds and mammals, and in a marked degree the anthropoid apes, cannot take care of themselves immediately after birth, though they soon become able to do so. The lower we descend the animal scale, the more completely organized is the psychical life of the newly-born organism. The reason is obviously to be found in the greater speciality and complexity, and the consequent relative infrequency, of the coordinations made by the highest animals, and especially by man. When, for example, we put forth the hand to grasp an object, the muscular adjustments are as instinctive as those of the fly-catcher pouncing on an insect; "volition being concerned merely in setting the process going." But with us, the impressions which we receive and the motions which we make are endlessly varied, and the complex combinations of them occur *severally* with less frequency than is the case with the simpler combinations formed by lower animals. They are accordingly not coordinated before birth, though they are easily coordinated during childhood.[1]

A great number of psychical phenomena are thus satisfactorily explained by the hypothesis. But one further service, and a most signal one, is rendered by it; and this we must briefly indicate, in accordance with previous promises, before leaving the subject. The view of cerebral action here adopted settles the long-vexed question between the Lockian and Kantian schools as to the sources of knowledge; and the verdict, while partly favourable to each of these schools, is not wholly favourable to either. Let us reconsider the portion of our hypothesis which bears upon this question.

It follows from the general principles involved in the foregoing exposition, that the peculiar intellectual activity of any parent, by modifying the nutrition of his cerebral tissue, must impress itself upon the unstimulated and half-developed brain of his infant offspring. Eliminating the effects wrought in it by countless environing circumstances, we may say that the infant brain just as surely tends to develop transit-lines similar to those in the parental brain, as the infant face tends to develop muscular peculiarities of expression like those characteristic of the parental face. And while the tendency is so slight as to count for little or nothing in the case of the more complex and infrequent associations of ideas, it must be a resistless tendency in the case of those nerve-connections which answer to associations involved in every act of experience,—as, for example, those concerned in building up our conceptions of space, time, force, and causation. A concise restatement of the case will now lead us at once to our conclusion. While ancestral experience impresses upon the brain a nutritive

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[1] In the concluding chapter of this Part, I shall endeavour to show that this origination and prolongation of the period of infancy, which is the effect of increasing intelligence, is in turn the proximate cause of the genesis of social relations and of ethical feelings, and thus, indirectly, of the entire intellectual and moral supremacy of man.

tendency toward the formation of certain special nerve-connections, individual experience tends now to assist and now to check the inherited tendency. And so the number and direction of transit-lines in any brain is due to the cooperation of innumerable ancestral and individual experiences. Locke was therefore wrong in calling the infant's mind a blank sheet upon which experience is to write knowledge. The mind of the infant cannot be compared to a blank sheet, but rather to a sheet already written over here and there with invisible ink, which tends to show itself as the chemistry of experience supplies the requisite conditions. Or, dropping metaphor, the infant's mind is correlated with the functions of a complex mass of nerve-tissue which already has certain definite nutritive tendencies. On the other hand, the school of Leibnitz and Kant was wrong in assuming a kind of intuitional knowledge not ultimately due to experience. For the ideas formerly called innate or intuitional are the results of nutritive tendencies in the cerebral tissue, which have been strengthened by the uniform experience of countless generations, until they have become as resistless as the tendency of the dorsal line of the embryo to develope into a vertebral column. The strength of Locke's position lay in the assertion that all knowledge is ultimately derived from experience,—that is, from the intercourse between the organism and the environment. The strength of Kant's position lay in the recognition of the fact that the brain has definite tendencies, even at birth. The Doctrine of Evolution harmonizes these t
seemingly-opposite views, by showing us that in learning
are merely acquiring latent capacities of reproducing
and that beneath these capacities lie more or less p
nutritive tendencies, which are transmissible from pa
child.

I believe that the last difficulties which may hav
about the doctrine of the Test of Truth, expound

third chapter of our Prolegomena, are now swept away. It must be by this time quite clear that the inconceivability-test and the experience-test are merely the obverse faces of the same thing. An association of subject and predicate, which answers to an objective relation of which the experience has been absolutely uniform, must be absolutely indissoluble; and *vice versa.* The ultimate question at issue between Mr. Mill and Mr. Spencer thus becomes reduced to a question of terminology, save in one important particular, in which I have already shown that Mr. Mill is not only demonstrably wrong, but also inconsistent with himself. The foregoing exposition adds new weight to the argument by which it was formerly (Part I., Chap. iii.) proved that when Mr. Mill asserts that the negation of such an axiom as the indestructibility of matter, which is now inconceivable, was in past times conceivable, he virtually asserts that there was a time when men could frame inner relations of which the corresponding outer relations had never been presented in experience. And thus he not only runs counter to the general theory of Life as Adjustment which is here adopted, but he contravenes his own favourite doctrine of the experiential origin of all knowledge, which is in reality part and parcel of that general theory of life.

With these corollaries I must conclude this too brief account of the process of psychical evolution. In the present chapter and its two predecessors, while steadily refraining from the chimerical attempt to identify Mind with some form of Matter or Motion, it has nevertheless been shown that, owing to the mysterious but unquestionable correlation which exists between the phenomena of Mind and the phenomena of Matter and Motion, it is possible to describe the evolution of the former by the same formula which describes the evolution of the latter. By a continuous differential compounding of impressions, we pass, through infinitesimal stages, from the relatively homogeneous and simple set of correspondences known as reflex action, mani-

fested alike by the highest and the lowest anin to those
exceedingly complex and heterogeneous sets of correspon
ences known as reason and volition, which are ma
only by the highest animals, and in their greatest co
by man alone. Throughout this wonderful process
seen how closely the evolution of psychical function
correlated with the evolution of nerve structure. But
as has been our gain during the foregoing ex
theory of psychical evolution is as yet by no me
plete. Concerning the relations of Mind to L and co
cerning the Composition and Evolution of Mind in gene
we have obtained many valuable results. But nothi
has as yet been said concerning the especial mode of gene
of those highest manifestations of thought and fe
which distinguish civilized man. This problem must
duly treated before our account of psychical evolution can
regarded as complete even in outline. Upon questions of
sort, however, we are not yet prepared to enter.
highest manifestations of thought and feeling which tinguish civilized man from inferior mammals, and in a less-marked degree from uncivilized man, are the products of countless ages of social evolution; and before we can hope to understand their mode of genesis, we must see what are the teachings of history and psychology concerning the character of social evolution in general. Having shown how, starting from a relatively low degree of sociality, a relatively high degree is attained in conformity to the general theory of Life as Adjustment, we shall be better enabled to comprehend the genesis of that lowest degree of sociality, the attainment of which was the decisive step which first raised Man above the level of the Brutes. The four following chapters will therefore be concerned with Sociology; and the last will be devoted to clearing away a complicated misunderstanding, by the help of which metaphysicians have long sought, and still seek, to deter us from applying scientific methods of interpretation to the phenomena of human history.

CHAPTER XVII.

SOCIOLOGY AND FREE-WILL.

THAT the phenomena manifested by human beings, as grouped in societies, conform to fixed and ascertainable laws, is a proposition which has thus far been taken for granted, inasmuch as it is logically inseparable from the other sets of propositions which go to make up our Cosmic Philosophy. Not only, moreover, have we thus tacitly assumed that social phenomena conform to law and may be made the subject of science, but in the fourth chapter of this Synthesis it was expressly stated that the fundamental law to which they conform is the Law of Evolution, which has now been proved to hold sway among inorganic and organic phenomena, as well as among those super-organic phenomena which we distinguish as psychical. Under ordinary circumstances we might fairly go on and justify our tacit assumption and our explicit assertion, by showing, both deductively and inductively, that the evolution of society follows in general the same method as the evolution of organic life. In the following chapter I shall proceed to do this. I shall show, first, that social evolution consists in the integration of human families or tribal communities into larger and larger groups, which become ever more heterogeneous and more interdependent; and secondly, that what we call civilization consists in the ever increasing definiteness and complexity of the correspondence between the community and the environment. Thirdly, I shall carry on the inquiry to a point somewhat in advance of Mr. Spencer's exposition, as it now stands, and show how these truths must be supplemented in order to give us a law of social evolution which shall cover social phenomena simply, excluding the more general phenomena of organic life.

But while under ordinary circumstances it might be well enough to proceed directly to such an investigation, since there is no better way of proving that certain groups of phenomena conform to law than by pointing out the law to which they conform, nevertheless in the present case I think it desirable to preface the inquiry with a brief discussion of one or two logical and psychological truths—truths of method and of doctrine—which lie at the basis of sociology. In our survey of the simpler sciences, no such preface was called for. In beginning to treat of biological truths, we did not deem it necessary to prove that waste and repair proceed according to immutable laws, or to forestall possible cavils by declaring that, although we cannot predict our states of health from week to week, nevertheless organic phenomena are not the sport of chance. It is otherwise in sociology, which is a new science, encumbered with many popular misconceptions, and regarded with an evil eye by theologians,—persons who profess great devotion to the interests of advancing knowledge in general, while the particular advance in knowledge at any time going on somehow never happens to be the one which they think fit to regard with favour. Of each new trophy which Science has from time to time laboriously won, these opponents have hastened to declare, "Behold it is the last!" Though the phenomena presented by the heavenly bodies, by the surface of the earth, and by the life which [illegible] earth, have one after another, in spite of [illegible] protest, been made the subjects of [illegible]

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[1] "Als Pythagoras seinen berühmten Lehrsatz [illegible] Göttern eine Hekatombe, d. h. ein Opfer von [illegible]

maintained that the results of human volitions can never become amenable to scientific treatment. Here, it is cried, on the threshold of sociology we must take our final stand, and insist, in the interests of religion and morality, that although all other events may occur in regular sequence, nevertheless in human affairs there is no such sequence. The arguments by which it is sought to establish this desperate proposition, are based partly on those facts which are assumed to prove the freedom of the will, partly on the endless diversity and complexity of human affairs. Concerning this latter class of considerations, I may say here that they are at once irrelevant and inconclusive. Irrelevant, since even if it were to be granted—which it is not—that the extreme intricacy of social phenomena may prevent our discerning the order of their sequence, this would prove, not that there is no sequence, but that our vision is limited. Inconclusive, because from the nature of the case, other things being equal, complex phenomena cannot be generalized until the simpler phenomena which they involve have been mentally reduced to orderly succession. As we shall again have occasion to notice, the laws of social life could not be discovered until the sciences of biology and psychology had gone far toward formulating the laws of physical and psychical life in general. But the misconceptions which cluster about this subject are so numerous that they may best be eliminated by a somewhat detailed controversy. Let us examine the argument from complexity, as presented by Mr. Froude, and afterwards the argument from the assumed lawlessness of volition, as presented by Mr. Goldwin Smith.

Mr. Froude begins[1] by dogmatically denying that there is or can be such a thing as a science of history. There is something incongruous, he says, in the very connection of the two words. "It is as if we were to talk of the colour of sound, or the longitude of the rule-of-three." But he carries on the thought in a way that shows plainly his reluctance to grapple fairly with the problem. In his next sentence he says, "where it is so difficult to make out the truth on the commonest disputed facts in matters passing under our very eyes, how can we talk of a science in things long past, which come to us only through books?" Now to reason like this, is merely to shrink from the encounter. For the question is, not whether the science is difficult, but whether it is possible. Mr. Froude sets out to show that there can be no such science, and his first bit of proof is that, if there is such a science, it must be far more difficult than any other; a position which we may contentedly grant. Let us follow him a step farther. "It often seems to me as if history were like a child's box of letters, with which we can spell any word we please. We have only to pick out such letters as we want, arrange them as we like, and say nothing about those which do not suit our purpose." And what does all this amount to? Is this Mr. Froude's idea of historical investigation? Why, the same thing may be done in any science. We have only to pick out all the facts on one side, and blink all the facts on the other side to prove the veracity of every oracle, soothsayer, and clairvoyant that ever existed, the validity of every paltry omen, the credibility of every crazy notion of alchemy or judicial astrology. In this way we may prove that the homœopathist always saves his patient, while the allopathist always kills him; or *vice versa*. And it was in this way that the phrenologists erected their pseudo-science. By following this method, also, it becomes easy to prove that Henry VIII. was an exemplary husband. It is in this way that [illegible] incorrect or inadequate hypothesis in physical sci[illegible] history has arisen and gained temporary [illegible]ognition [illegible] Tycho Brahe had said to his Coper- [illegible] antag[illegible]onomy is like a child's box of letters;

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[1] [illegible] wind.” [illegible]

if we take out what we want and let the rest go, we can spell whatever we please; I spell out the Ptolemaic hypothesis, and will therefore abide by it;"—he would have been talking much after the manner of Mr. Froude. It is true, as Mr. Froude further says, that one philosopher believes in progress, a second in retrogression, and a third, like Vico, in ever-recurring cycles. But is this because the facts are undecipherable, or because the investigation is one-sided? Because Agassiz still believes organic species to be fixed, while almost all other naturalists believe them to be variable in character, are we to infer that there is no science of biology? In such unworthy plight does Mr. Froude retreat before the problem he has encountered. He starts to show us that a science of history is as ridiculous an impossibility as a scarlet B-flat or a westerly proportion; and he ends by mildly observing that history is a difficult subject, in which a series of partial examinations may bring forth contradictory conclusions!

The next bit of inference concerns us more intimately. "Will a time ever be when the lost secret of the foundation of Rome can be recovered by historic laws? If not, where is our science?" Just where it was before. The science of history has nothing to do with dates, except to take them, so far as they can be determined, from the hands of historical criticism. They are its data, not its conclusions. As Mr. Morley reminds us, we do not dispute the possibility of a science of meteorology, because such a science cannot tell us whether it was a dry or a wet day at Jericho two thousand years ago. Facts like these show us that sciences dealing with phenomena which are the products of many and complex factors, cannot hope to attain that minute precision which is attained by sciences dealing with phenomena which are the products of few and simple factors. They show that sociology cannot, like astronomy, be brought under the control of mathematical deduction. But it was not necessary for Mr. Froude to write an essay to prove this.

But, continues Mr. Froude, "can you imagine a science which would have *foretold* such movements as" Mohammedanism, or Christianity, or Buddhism? To the question as thus presented, we must answer, certainly not. Neither can any man foretell any such movement as the typhoid fever which six months hence is to strike him down. If the latter case does not prove that there are no physiologic laws, neither does the former prove that there are no laws of history. In both instances, the antecedents of the phenomenon are irresistibly working out their results; though, in both cases, they are so complicated that no human skill can accurately anticipate their course. But to a different presentment of Mr. Froude's question, we might return a different answer. There is a sense in which movements like Mohammedanism, or Buddhism, or Christianity, could not have been predicted, and there is a sense in which they could have been. What could not have been predicted was the peculiar character impressed upon these movements by the gigantic personalities of such men as Mohammed and Omar, Sakyamuni, Jesus and Paul. What could have been predicted was the general character and direction of the movements. For example, as I shall show in the following chapter, Christianity as a universal religion was not possible until Rome had united in a single commonwealth the progressive nations of the world. And when Rome had accomplished this task, it might well have been predicted that before long a religion would arise, which should substitute monotheism for polytheism, proclaiming the universal fatherhood of God, and the universal brotherhood of men. I admit that such a prediction could have been made only by a person familiar with scientific modes of thought not then in existence; but could such a person have been present to contemplate the phenomena, he might have foreseen such a revolution in its main features, as being an inevitable result of the interaction of Jewish, Hellenic and Roman ideas. I am inclined to think he might have foreseen that it would arise in Palestine, that its spread would be confined to the area covered by Roman civilization, and that its work would for a long time be most thorough in the most thoroughly Romanized regions.

We do not need, however, to insist upon this point. For in none of the concrete sciences is there anything like thorough and systematic prevision, save in astronomy; and even in astronomy, our foresight becomes precarious as soon as we pass beyond the solar system, and begin to inquire into the results of the mutual gravitation of the innumerable stellar bodies. We know that our sun is rushing, with immense velocity, toward the constellation Hercules; but we cannot yet trace his orbit, as Kepler traced the orbit of Mars. When we come to biology and psychology, the power of accurate prevision is very small; yet no one denies that the phenomena of life and intelligence conform to fixed and ascertainable laws. In sociology we must expect still less ability to predict. The truth is, as Comte acutely pointed out, that while in the simpler sciences our object is gained if we can foretell the course of phenomena so as to be able to regulate our actions by it, in the more complex sciences our object is gained when we have generalized the conditions under which phenomena occur so as to be able to make our volitions count for something in modifying them. We cannot modify astronomic phenomena, but we can predict them. We cannot predict, save to a limited extent, biologic phenomena; but, knowing more and more thoroughly the conditions under which they occur, we can more and more skilfully modify them so as to ensure health or overcome disease. And obviously even this limited ability to modify the phenomena implies a certain amount of prevision,—quite enough to justify us in asserting that the phenomena conform to law. The case is similar in sociology. Though we may not be able definitely to predict a given political revolution, we may nevertheless understand the general movement of affairs and the effects which certain kinds of legislation are likely to produce, so as to hasten a desired result or avert social mischief. Upon this possibility are based all our methods of government and of education. And, as in biology, this ability to modify the phenomena proves that the phenomena occur in some fixed order of sequence. For if there were phenomena without any definite order of sequence, we could neither predict nor modify them; and where there is a definite order of sequence, there is, or may be, a science.

Now in denying that there is or can be a science of history, Mr. Froude, if he means anything, means that social affairs have no fixed order of sequence, but are the sport of chance. Either Law or Chance—these are the only alternatives, unless we were to have recourse, like the Mussulman, to Destiny, an illegitimate third idea, made up of the other two misconceived and mutilated in order to fit together. But for the modern thinker there is no middle course. It is either symmetry or confusion, law or chance, and between the two antagonist conceptions there can be no compromise. If the law of causation is universal, we must accept the theory of law. If it has ever, in any one instance, been violated, we may be excused for taking up with the theory of chance. Now we know that all the vast bodies in this sidereal universe move on for untold ages in their orbits, in strict conformity to law. In conformity to law, the solar system in all its complexity has grown out of a homogeneous nebula; and the crust of the cooling earth has condensed into a rigid surface fit for the maintenance of organic life. Out of plastic materials furnished by this surface and the air and moisture by which it is enveloped, organic life has arisen and been [illegible] differing forms, all in accordance with law. [illegible] of organic existence, man, the most [illegible] type, lives and moves and has his [illegible] to law. His periods of activity [illegible] by planetary rotations.

His achievements, physical and mental, are determined by the rate of his nutrition, and by the molecular structure and relative weight of the nervous matter contained in him. His very thoughts must chase each other along definite paths and contiguous channels marked out by the laws of association. Throughout these various phenomena, already generalized for us by astronomers, geologists, biologists, and psychologists, we know that neither at any time nor in any place is law interfered with,—that yesterday, to-day, and for ever, the effect follows the cause with inevitable and inexorable certainty. And yet we are asked to believe that in one particular corner of the universe, upon the surface of one little planet, in a portion of the organism of one particular creature, there is one special phenomenon, called volition, in which the law of causation ceases to operate, and everything goes helter-skelter!

Such is the demand which Mr. Froude makes upon our powers of acquiescence, and such is the theory which Mr. Goldwin Smith, in the interests of theology, pronounces it unphilosophical, if not impious, for us to reject. Of the Science of History, Mr. Smith asserts that "it extinguishes all sympathy"; it "must put an end to self-exertion"; it "would dissolve the human family"; it makes man the most helpless of animals, no better in fact than "a beast or a blade of grass"; it degrades humanity to mere clay; it establishes "a strange contradiction between our outward observation and our inward consciousness; it makes us "render up our personality," and become "a mere link in a chain of causation, a mere grain in a mass of being"; it builds up, "with much exultation," an "adamantine barrier of law"—whatever that may be—between man and the source of all goodness; and, to crown all, it tells us that "conscience is an illusion," and prevents our having any "rule of right action."[1]

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[1] *Lectures on the Study of History*, pp. 63, 67, 48, 82, 85, 87, 59. Far abler men than Mr. Smith or Mr. Froude have in like manner allowed their

Hard words are as powerless to overthrow as to establish a philosophical theory. In scientific inquiry the ability to weigh evidence goes for much, but facility in declamation goes for little. And to anyone who has been brought up amid scientific pursuits, there is but little that is instructive or edifying in the fervid rhetoric of a writer who, in attacking a disagreeable doctrine, prefers to stigmatize it as disagreeable, rather than to show that the evidence is against it. Nevertheless beneath the emotional assertions just quoted there lies a complicated theoretical misconception, the character of which it is worth our while to examine. The well-worn argument is that unless the human will were "free," there could be no responsibility, and therefore no morality; that if volitions are caused, even though it be by our own desires, we are all in a condition similar to that of the man who has made a promise under duress, to whom neither praise nor blame can justly be attached for the manner in which his promise is kept.

It is popularly supposed that there is something very formidable in this argument, and that when coupled with the opposing arguments drawn from such evidences as are daily accessible among human affairs, the result is a puzzle which must for ever remain insoluble. The problem of free-will has been described by poets and is customarily regarded as the most difficult problem which can occupy human attention, and we frequently hear it said that it can never be

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feelings [illegible] the question [illegible]
picture [illegible] automaton [illegible]
cannot [illegible]
[illegible]
machine. [illegible]
machine [illegible]
[illegible]
philosophy [illegible]
[illegible]

completely solved. But in reality all this perplexity is the result of the desperate muddle into which metaphysics has brought the subject. Strip the question of the peculiar metaphysical jargon in which it is usually propounded, restate it in precise scientific language, and it becomes a very easy question to answer. Would that science presented none more difficult! Confused and inaccurate verbiage is responsible for the chronic disputation upon this subject. Nowhere else is Berkeley's complaint so thoroughly applicable, that in dealing with metaphysics men first kick up a dust and then wonder why they cannot see through it. Those who have come to regard the question from a purely scientific point of view, also regard it as thoroughly settled; and the need for refuting such arguments as the one above cited, they class among the needs, too often thrust upon us, of refuting fallacies already thrice exploded. In illustration of this, let us notice the theory which the free-will argument implies concerning the nature of volition.

The theory implies that over and above particular acts of volition, there is a certain entity called "The Will," which is itself a sort of personage within the human personality. This entity, called "The Will," is supposed to have desires and intentions of its own, which the causationists are supposed to declare constantly liable to be frustrated by external agencies. In opposition to this imaginary heresy, it is asserted that this autocratic Will is "free," and sitting in judgment over "motives," may set aside the stronger in favour of a weaker, or may issue a decree in defiance of all motives alike. Some such crude conception as this is implicitly conveyed by every statement which, alluding to the Will as an entity, ascribes "freedom" to it. Only by means of such a conception can the phrase "freedom of the Will" be shielded from the imputation of nonsense. Only thus can the argument above cited be regarded as relevant to the subject in dispute. For if Will be not conceived as an of ideas in the hemispherical ganglia, there is in like manner a reaction or desire of determination of energy outwards, in accordance with the fundamental property of organic structure to seek what is beneficial and to shun what is hurtful to it. It is this property of tissue that gives the impulse which, when guided by intelligence, we call volition; and it is the abstraction from the particular volitions which metaphysicians personify as the Will. . . . Physiologically we cannot choose but reject the Will: volition we know, and will we know, but the Will, apart from particular acts of volition or will, we cannot know. To interpose such a metaphysical entity between reflection and action thereupon, would bring us logically to the necessity of interposing a similar entity between the stimulus to the spinal cord and its reaction. Thus instead of unravelling the complex by help of the more simple, we should obscure the simple by speculations concerning the complex." As scientific inquirers, "we have to deal with volition as a function of the supreme centres, following reflection, varying in quantity and quality as its cause varies, strengthened by education and exercise, enfeebled by disease, decaying with decay of structure, and always needing for its outward expression the educated agency of the subordinate motor centres. We have to deal with will, not as a single undecomposable faculty unaffected by bodily conditions, but as a result of organic changes in the supreme centres, affected as certainly and seriously by disorder of them as our motor faculties are by disorder of their centres. Loss of power of will is one of the earliest and most characteristic symptoms of mental derangement; and whatever may have been thought in times past, we know well now that the loss is not the work of some unclean spirit that has laid its hands upon the Will, but the direct effect of physical disease."

Volition is, accordingly, that transformation of feeling into

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[1] *Body and Mind*, pp. 22, 23.

action which is attended by a conscious [illegible] pressions, and which involves numerous [illegible] brum or cerebellum, or in both. [illegible] ceding chapter, the sequence of [illegible] either reflex or instinctive and [illegible] long as the nervous energy [illegible] instantly discharged through a [illegible] nel or set of channels. But [illegible] which an immensely varied [illegible] merable complex systems [illegible] intervenes between the [illegible] its discharge upon the [illegible] there is a tension between [illegible] ing to discharge itself [illegible] transit. We saw also [illegible] of conscious delibera[illegible] feelings of desire or [illegible] to be justified by the [illegible] tion of any given [illegible] transit-lines inv[illegible] that there is [illegible] then the acts [illegible] luntary and a[illegible].

Now the state [illegible] panied by a [illegible] upon the [illegible] the attainment [illegible] go through [illegible] desire; and [illegible] tagonist [illegible] dynamic [illegible] tension [illegible] tension [illegible] for practical purposes be regarded indifferently as the final stage of emotion or as the initial stage of action.

Passing from the case in which a single desire is operative let us briefly consider the special case of two conflicting desires, where the gratification of the one is incompatible with that of the other. In this case, two groups of motor-nerves are nascently-excited. Here there are two opposite tensions, and the resulting action will depend on their comparative strength. If they exactly neutralize each other, as in the hypothetical case of the ass between the two bundles of hay, no volition will ensue. But in a complex aggregate, like the human or animal organism, such a state of equilibrium cannot be of long continuance. Sooner or later,—either from the greater vividness with which one of the desired objects is mentally realized, or from any one of a thousand other disturbing circumstances down to those of a purely physical nature,—one desire will become stronger than the other. And instantly thereupon, the surplus nervous tension remaining after the weaker desire is neutralized, will pass into nervous *vis viva*; or, in other words, volition will take place.

The opposing tension need not, however, have desire for its concomitant. It may be furnished by the mere inertia of the nervo-muscular system; as when a man, wishing to do something which requires exertion, is too weary to do it. Weariness implies a diminution in the total amount of contractile force; a state in which a tension greater than ordinary is obviously required for the initiation of muscular motion. Conversely, the originating tension need not always be supplied by desire, but may be consequent upon vivacity, which is the presence of a superfluous amount of vital energy; as exemplified alike in the morning frolics of an infant, in the singing of birds, and in the gambols of a dog when released from his kennel.

Cases as simple as those here treated occur no doubt with comparative infrequency. Usually a great number of motives, indefinitely complex and variable in their mutual combi tions and oppositions, are simultaneously operative. however numerous or complicated the forces at work, f whatever source the motives to action or inaction arise, w ever be the nature of the incentives to one kind of cond or to some other kind, it is equally true that the depends upon their comparative strength. Indee forces can be measured only by their effects, to say of two conflicting motives one is followed by volition, i call that motive the stronger one. "Our only evidence o excess of force is the movement it produces"; and when the ancient engineer wished to ascertain the comparative power of a couple of catapults, he had no alternative but to which would hurl its stone to the greater distance. To explicitly that volition does not follow the strongest m is to say implicitly that motion does not always follow line of least resistance; which is to deny the persiste of force.

Volition being accordingly regarded as the process w feeling initiates action, it becomes evident that the term "free" is no more applicable to it than the term "copper-coloured." As Mr. Bain observes; "The designation 'liberty of choice' has no real meaning, except as denying extraneous interference. If I am interfered with by another person compelling me to act in one way, then it may be said, intelligibly enough, that I have not liberty of choice. But, as between the different motives of my own mind, there is no meaning in the use of the word 'liberty.' Various motives,—present or prospective pleasures and pains,—concur in urging me to act. The result of the conflict shows that one group is stronger than another, and that is the whole case."[1] Or, as M. Littré has still more forcibly reminded us, the term "liberty," as applied to volition, *means* the power of obeying the strongest motive. When that power is interfered with, by paralysis or insanity, or the constraint exercised by other persons, then we may truly say that we are deprived of free-will and of responsibility. But so long as circumstances allow volition to follow the strongest motive, then we truly say that we are free and responsible for our actions. Thus the tables are completely turned, and much of the current disputation on this subject is reduced at once to unmeaning verbiage. The popular arguments in favour of "freedom" are seen to be as palpable cases of *ignoratio elenchi* as are those daily urged against the development hypothesis. By a scientific definition of Will, the assertion of freedom is set aside as irrelevant, leaving behind the assertion of non-causation. That this too is virtually disposed of by the same definition, scarcely needs pointing out. Yet, for the sake of still greater clearness, our present results may fitly be supplemented by a new class of considerations.

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[1] Bain, *The Emotions and the Will*, 1st edit. p. 550.

That volitions differ from all other phenomena by their capability of occurring without any cause, is the opinion of the free-will philosophers; and Mr. Smith, in criticizing the contrary opinion, remarks that "if comets formed their own future" (*i.e.*, were endowed with volition), "they would be rather embarrassing subjects of science." Without attempting to decipher the vagaries in which these cosmical bodies might in such case take it upon themselves to indulge,[1] it will be enough for my present purpose to point out some of the shoals on which the free-will doctrine must land its defenders. If volitions arise without cause, it necessarily follows that we cannot infer from them the character of the antecedent states of feeling. If, therefore, a murder has been committed, we have *à priori* no better reason for suspecting the worst enemy than the best friend of the murdered man. If we see a man jump from a fourth-story window, we must beware of too hastily inferring his insanity, since he may be merely exercising his free-will; the intense love of life implanted in the human breast being, as it seems, unconnected with attempts at suicide or at self-preservation. We can thus frame no theory of human actions whatever. The countless empirical maxims of every-day life, the embodiment as they are of the inherited and organized sagacity of many generations, become wholly incompetent to guide us; and nothing which any one may do, ought ever to occasion surprise. The mother may strangle her first-born child, the miser may cast his long-treasured gold into the sea, the sculptor may break in pieces his lately-finished statue, in the presence of no other feelings than those which before led them to cherish, to hoard, and to create.

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[1] In point of fact a comet does "form its own future" in the same way that a man does. The state of a heavenly body at any given moment is a product, partly of the forces, molar and m ular, with which it was endowed at the preceding moment, and partly o e forces simultaneously exerted upon it by environing heavenly bodies e case of hum from this in nothing save the num omplexity, tive incalculableness, of the fore

To state these conclusions is to refute their premise. Probably no defender of the doctrine of free-will could be induced to accept them, even to save the theorem with which they are inseparably wrapped-up. Yet the dilemma cannot be avoided. Volitions are either caused, or they are not. If they are not caused, an inexorable logic brings us to the absurdities just mentioned. If they are caused, the free-will doctrine is annihilated. No help is afforded by the gratuitous hypothesis that there is a connection between the act and the motive, which yet is not a causal connection. Such connection, if it exist, must be a case either of conditional invariable sequence, or of unconditional invariable sequence. On the first supposition, we have a case like the succession of day and night, in which both terms of the sequence are conditioned upon a third fact; so that here we do not escape causation. The second supposition is but an assertion of causation in other words. While to take refuge in the postulate that [illegible] assumed connection is a case of variable [illegible] and deny connection in the same breath.

But it is said that consciousness declares the Will to be free; and therefore that any attempt to disprove its freedom by reasoning is suicidal, since all such reasoning must end by impugning the veracity of that consciousness on which its own data are ultimately based. An ingenious argument truly, the conclusion whereof would be more readily admitted, if its premise were true. Consciousness, which is so confidently appealed to as establishing by its infallible verdict the doctrine of free-will, in fact says nothing about the matter. That volitions are uncaused, is a proposition altogether too indirect for consciousness to sit in judgment upon, and it can neither be proved nor disproved by simple introspection. It would have been equally appropriate for the mediæval astronomer to appeal to consciousness as testifying to the revolution of the sun about the earth. As Mr. Bain observes, "it is a great stretch of asseveration to call the construction of an enormous theory an act of consciousness so simple that we cannot make a slip in performing it."[1] Consciousness tells us only that we will. By observation and experience—not by the simple and direct interrogation of consciousness—we know that, circumstances permitting, our volitions may be accomplished. With the exception, therefore, of those theological fatalists who assert that human actions are determined by an external constraining power, it is the universal opinion that men can voluntarily determine their own actions; and this is just what the much-abused testimony of consciousness amounts to. This is all that it means to anyone not mystified by metaphysics; the non-causation of volitions being a theorem so far from obvious to a great many men, that it requires considerable explanation to make them understand it. By the testimony of consciousness, as thus interpreted, the assertors of the lawlessness of volition are not helped in the least. The question at issue between them and their opponents is, not whether the actions of men are normally free, but whethe freedom is consistent with their being caused. The asser of "Free-Will" maintain that causation is inconsistent liberty.[1] The so-called necessarians assert that liberty causation are quite consistent with each other. To which must now add, that it is not causation, but the abs thereof, which is as incompatible with liberty as it is with

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[1] *The Emotions and the Will*, 1st edit. p. 563.

For the causationist, believing that volition invar follows the stronger motive, endeavours to increase relative strength of all those emotions whose outcome virtuous and upright conduct, while he strives to wea those feelings whose tendency is toward base and ignoble conduct. Knowing that by continual indulgence desire is re forced, while by constant repression it is enfeebled, he ap this knowledge to the control of his will and the disciplin his character. But on the theory that volitions are causel all methods of self-discipline become of no avail. If are powerless to influence action, it is of small pra importance whether noble and sympathetic or base and se motives are prevalent; and the moral distinction between them loses most of its significance. Why, asks Mr. Smith, "is a Philip II. more the subject of moral disapprobation than the plague?" Why, indeed, unless his atrocious crimes are to be interpreted as the necessary outgrowth of a character wherein good motives were impotent and bad motives all-powerful. Were volition self-determining, then similar acts might have been committed by a Washington or a Borromeo. Obviously there would be little use in laboriously schooling our desires to virtue, if at any moment in spite thereof, some uncaused volition might bring forth from us a detestable deed. It is therefore not the doctrine of causation, but the so-called free-will doctrine, that, if true, would "put an end to self-exertion," and deprive us of every "rule of right action." Since self-control, and therefore liberty, is impossible unless volition is determined by desire; it is the latter doctrine—not the former—which is really inconsistent with the assertion of human freedom, which takes from us the dignity of responsibility, and makes man the sport of a grotesque and purposeless chance.

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[1] "The law of bondage throughout the universe is the law of cause and effect. In the violation, then, of this law, true freedom must consist." Ferrier, *Lectures and Philosophical Remains*, vol. ii. p. 255. One might expect such a remark as this from Mr. Goldwin Smith, who speaks of being "bound by the chain of certain causation"; but from so acute a thinker as Prof. Ferrier, it is surprising. To adopt, in a somewhat altered sense, Kant's happy illustration,—the spectacle of a bird denouncing as an encumbrance the air by which alone it is enabled to fly, would be a fitting parallel to the spectacle of those philosophers who decry that regularity of sequence through which alone has "freedom" any meaning. As Lessing long ago said, with well-bestowed contempt, "Le beau privilège d'être soumis à une puissance aveugle qui ne suit aucune règle! *En serait-je moins le jouet du hasard parce que ce hasard résiderait en moi!*"

In truth, the immediate corollaries of the free-will doctrine are so shocking not only to philosophy but to common-sense, that were not accurate thinking a somewhat rare phenomenon, it would be inexplicable how any credit should ever have been given to such a dogma. This is but one of the many instances, in which by the force of words alone, men have been held subject to chronic delusion. The libertarian doctrine has obtained currency because it has talked loudly of human freedom, with which nevertheless a brief analysis proves it to be incompatible. Substitute for the unmeaning phrase "freedom of the Will," the accurate phrase "lawlessness of volition," and the theory already looks less plausible. In place of the vague and ambiguous word "necessity," write the clear and definitely-connotative word "causation," and the scientific theory at once loses its imaginary terrors. The titles with which the free-will doctrine decorates itself, and those with which it brands its opponent, are alike "question-begging epithets." They serve to prejudge the point at issue.

Not content with the overwhelming prestige which its name thus gives it, the free-will doctrine seeks to follow up its advantage by identifying its antagonist with Asiatic

fatalism; a confusion of ideas like that under which
Bounderby laboured, when unable to see the differ
between giving workmen their just dues, and feed
with turtle-soup out of a gold-lined spoon. To s
actions dependent on volition will take place whenev
essential conditions are present, and to say that they w
place even if the conditions are absent, are by
theorists held to be one and the same assertion![1]
is, however, much more closely akin to their own u
Each ignores causation; each is incompatible with pe
freedom; the only difference between them being th
one sets up Chance, while the other sets up Destiny, as
arbiter of human affairs. And while each doctrine is th
retically held by large bodies of men, each in practic
habitually contradicted by its upholders. The defende
free-will, who in practice are obliged to admit a certain
nection between acts and motives, and the Arab f
among whom the saying is current that "when
an event, he prepares the causes beforehand," al
emplify this. Though both agree in repudiating causation, both equally in their every-day maxims give evidence of an unconscious belief in its existence.

Having identified the causation theory with fatalism, it becomes all the easier for its opponents to accuse it of denying moral responsibility. Accordingly, when Mr. Buckle, following in the footsteps of Laplace, inferred from the regularity of the statistics of crime and suicide, marriages and dead-letters, that voluntary actions conform to law;[2] it was proposed by one of his reviewers that state-governments should at once suspend judicial operations, and having ascertained from statistics the yearly number of murders, should forthwith hang a corresponding number of individuals, selected by lot from the community. To which suggestion the natural reply would have been, that if governments ever do adopt this singular course of administering justice, they will then be consistently acting on the belief that motives do not stand in a causal relation to volitions. If the volition can follow the weaker motive, the feelings which ordinarily deter from the commission of crime, need not be strengthened by the fear of punishment.[1]

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[1] "It is owing to the very general misconception of the nature of Law that there arises the misconception of Necessity; the fact that events arrive irresistibly whenever their conditions are present, is confounded with the conception that the events must arrive whether the conditions be present or not, being fatally predetermined. Necessity simply says that whatever is is, and will vary with varying conditions. Fatalism says that something *must be*; and this something cannot be modified by any modification of the conditions." —Lewes, *Problems of Life and Mind*, vol. i. p. 309.

[2] Buckle, *Civilization in England*, vol. i. pp. 20—30; Laplace, *Essai sur les Probabilités*, p. 76.

Thus do all the favourite arguments in behalf of the free-will hypothesis recoil upon its defenders. To adopt from barbarian warfare, an ungraceful but expressive simile, they are like awkwardly-thrown boomerangs which wound the thrower. Attempting, as the free-will philosophers do, to destroy the science of history, they are compelled by an inexorable logic to pull down with it the cardinal principles of ethics, politics, and jurisprudence. Political economy, if rigidly dealt with on their theory, would fare little better; and psychology would become chaotic jargon. That psychical actions, and volitions among them, conform to law, is the indispensable axiom of every science or philosophy which treats of the mind and its products, whether indi-if each epoch is not determined by the preceding epoch, then the inference is inevitable that the French Revolution might have happened in the reign of Louis XI., or that the progress of Christianity might have been eastward instead of westward. Thus all conception of progress, as well as all conception of order, is at an end. Thus the vast domain of History, numbering among its component divisions the phenomena of Language, Art, Religion, and Government, the products of social activity as well as the phases of social progress, becomes an unruly chaos, a Tohu-va-Bohu, where event stumbles after event, and change jostles change, without sequence and without law.

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[1] "The very reason for giving notice that we intend to punish certain acts, and for inflicting punishment if the acts be committed, is that we trust in the efficacy of the threat and the punishment as deterring motives. If the volition of agents be not influenced by motives, the whole machinery of law becomes unavailing, and punishment a purposeless infliction of pain. In fact it is on that very ground that the madman is exempted from punishment; his volition being presumed to be not capable of being acted upon by the deterring motive of legal sanction. The *free* agent, thus understood, is one who can neither feel himself accountable, nor be rendered accountable to or by others. It is only the *necessary* agent (the person whose volitions are determined by motives, and, in case of conflict, by the strongest desire or the strongest apprehension) that can be held really accountable, or can feel himself to be so." Grote, *Review of Mill's Examination of Hamilton's Philosophy*, p. [illegible]

I think, therefore, we are quite justified in saying that, when stripped of the metaphysical jargon in which it is usually propounded, the question of free-will becomes an easy one to answer. Having laid the dust which metaphysicians have kicked up, we find our vision no longer obscured. From whatever scientific stand-point we contemplate the doctrine of the lawlessness of volition, we find that its plausibleness depends solely on tricks of language. The first trick is the personification of Will as an entity distinct from all acts of volition; the second trick is the ascription to this entity of "freedom," a word which is meaningless as applied to the process whereby feeling initiates action; and the third trick is the assumption that desires or motives are entities outside of a person, so that if his acts of volition were influenced by them he would be robbed of his freedom. Any-one, however, who is not misled by these verbal quibbles, and who bears in mind that a person, psychologically considered, is nothing more than the sum of his conscious states, will perceive at once that when the desires or aversions determine the volitional acts, it is the person himself who determines them. We have accordingly seen that, since liberty of choice means nothing if it does not mean the power to exert volition in the direction indicated by the strongest group of motives;

and since all control over character is impossible unless desires and volitions occur in a determinate order of sequence; it is the doctrine of lawlessness and not the causationist doctrine which is incompatible with liberty and destructive of responsibility. The rhetoric which Mr. Goldwin Smith lavishes, on the strength of a set of misapplied phrases, might therefore be justly retorted upon him, on the strength of a psychologic analysis. And this, which is the conclusion of science, we have seen to be also the conclusion of common-sense. Whatever may be our official theories, we all practically ignore and discredit the doctrine that volition is lawless. Whatever voice of tradition we may be in the habit of echoing, we do equally, from the earliest to the latest day of our self-conscious existence, act and calculate upon the supposition that volition, alike in ourselves and in others, follows invariably the strongest motive. And upon this ineradicable belief are based all our methods of government, of education, and of self-discipline. Finally, in turning our attention to history, we have found that the aggregate of thoughts, desires, and volitions in any epoch is so manifestly dependent upon the aggregate of thoughts, desires, and volitions in the preceding epoch, that even the assertors of the lawlessness of volition are forced to commit logical suicide by recognizing the sequence. Thus, whether we contemplate volitions themselves, or compare their effects, whether we resort to the testimony of psychology or to the testimony of history, we are equally compelled to admit that Law is coextensive with all orders of phenomena and with every species of change.

It is hardly creditable to the character of the present age for scientific enlightenment that such a statement should need to be made, or that twenty-six pages of critical argument should be required to illustrate it. To many this chapter will no doubt seem much like an elaborate attempt to prove the truth of the multiplication table. Nevertheless where such a blinding metaphysical dust has been raised, a few drops of the cold water of common-sense may be not only harmless but useful. Having thus done somewhat to clear the air, we may next proceed to point out the way in which social changes conform to the Law of Evolution.

CHAPTER XVIII.

THE EVOLUTION OF SOCIETY.

ANY attempt to discover the laws to which social changes conform must run great risk of being frustrated by the mere immensity of the mass of details which the investigator strives to arrange in orderly sequence. Seemingly numberless as are the phenomena dealt with by the physical sciences, they bear no proportion, either in multitude or in variety, to the facts upon which the student of sociology must build his scientific theorems. Facts concerning man in his physical relations to soil, climate, food, and the configuration of the earth, blend with facts concerning the intellectual and moral relations of men to each other and to the aspects of nature by which they are surrounded, making up a problem of such manifold complexity that it may well have long been deemed incapable of satisfactory solution. The fit ground for wonder is, indeed, not that we are as yet unable to arrive at accurate prevision amid such a diversified throng of phenomena, but that, considering the meagreness of our knowledge in many other departments, we should have been able to detect any uniformity whatever in human affairs, and having detected it, to explain it upon trustworthy scientific principles.

There is but one way [illegible]duct such an intricate investigation securely to its [illegible] and that is, to make extensive use of elimination as it is employed in the simpler sciences. "If without any previous investigation of the properties of terrestrial matter, Newton had proceeded at once to study the dynamics of the universe, and after years spent with the telescope in ascertaining the distances, sizes, times of revolution, inclinations of axes, forms of orbits, perturbations, etc., of the celestial bodies, had set himself to tabulate this accumulated mass of observations, and to educe from them the fundamental laws of planetary and stellar equilibrium, he might have cogitated to all eternity without arriving at a result." This lucid illustration, which I have cited from the introduction to Mr. Spencer's "Social Statics," suggests the proper method of approaching the investigation of complex phenomena. Minor perturbing elements must for a time be left out of consideration, just as the inequalities of motion resulting from the mutual attractions of the planets were at first passed over in the search for the general formula of gravitation. The discussion of endless minute historical details must be reserved until the law of social changes has been deduced from the more constant phenomena, and is ready for inductive verification. A law wide enough to form a basis for sociology must needs be eminently abstract, and can be found only by contemplating the most general and prominent characteristics of social changes. The prime requisite of the formula of which we are in quest is that it should accurately designate such changes under their leading aspect.

Now by far the most obvious and constant characteristic common to a vast number of social changes is that they are changes from a worse to a better state of things,—that they constitute phases of Progress. It is not asserted that human history has in all times and places been the history of progress; it is not denied that at various times and in many places it has been the history of retrogression; but attention is called to the fact—made trite by long familiarity, yet none the less habitually misconceived—that progress has been on the whole the most constant and prominent feature of the history of a considerable and important portion of mankind.

Around this cardinal fact have clustered, as I just hinted, many serious misconceptions. The illustrious thinkers of the last century, who endeavoured to study human history from a scientific point of view, were unconsciously led into an error from which contemporary writers have not as yet entirely freed themselves. The followers of Turgot and Condorcet were prone to regard progress as something necessary and universal. They attempted to account for it, much as Lamarck tried to explain organic development, as the continuous and ubiquitous manifestation of an occult, inherent tendency toward perfection. Subsequent literature exhibits many traces of this metaphysical conception. Thus Dr. Whately, in his edition of Archbishop King's discourses, asserts that "civilization is the natural state of man, since he has evidently a natural tendency toward it." Upon which it has been aptly remarked that, "by a parity of reasoning, old age is the natural state of man, since he has evidently a natural tendency towards it." Indeed, as this comparison is intended to show, it is difficult to use such expressions as "natural state" and "natural tendency" without becoming involved in a confusion of ideas. And to ascribe progress to an inherent tendency, without taking into account the complex set of conditions amid which alone that tendency can be realized, is to give us an empty formula instead of a scientific explanation. Whether the individual will die young or reach old age, and whether the community will remain barbarous or become civilized, depends, to a great extent, upon environing circumstances; and no theory of progress can have any value which omits the consideration of this fact. Mr. William Adam labours under the confusion of ideas here signalized, when he finds fault with Sir G. C. Lewis for upholding the doctrine of progress while admitting that certain races have never advanced in civilization. For this, Mr. Adam accuses him of virtually dividing mankind into two differently-constituted races, of which the one possesses, while the other lacks, the inherent tendency toward perfection![1] He might as well maintain that because we admit that certain men are stunted, while others grow tall, we divide mankind into two differently-constituted races, of which the one possesses while the other lacks, the inherent tendency toward increase in size. Closely allied to this fallacy is that which associates lateness in time with completeness in development, and requires us to assume that nowhere at any time has there been a temporary retrogression. Thus Mr. Goldwin Smith appears to be confused by the impression that the temporary decline in the moral tone of English society after the Restoration of Charles II., is a fact inconsistent with the doctrine of a general progress. And Mr. Mansel still more preposterously declares that on the theory of progression we ought to regard the polytheism of imperial Rome as a higher form of religion than the earlier Hebrew worship of Jehovah. While another form of the same confusion is to be seen in the attempts which writers imbued with the conception of progress often make, to coax the annals of the past into affirming the uninterrupted advance of civilization.

These examples show how vaguely the doctrine of progress has hitherto been apprehended. The fallacy of supposing civilization to have proceeded serially, or uniformly, or in consequence of any universal tendency, is nearly akin to the fallacy of classifying the animal kingdom in a series of ascending groups,—a fruitful source of delusion, which it was Cuvier's great merit to have steadily avoided. The theological habit of viewing progressiveness as a divine gift to man,[2] and the metaphysical habit of regarding it as a necessary attribute of humanity, are equally unsound and equally fraught with error. Until more accurate conceptions are acquired, no secure advance can be made toward discerning the true order of social changes. Far from being necessary and universal, progress has been in an eminent degree contingent and partial. Its career has been frequently interrupted by periods of stagnation or declension, and wherever it has gone on, it has been forwarded, not by an inexplicable tendency or *nisus*, but by a concurrence of favourable conditions, external and internal. We must remember moreover, as Sir Henry Maine reminds us,[1] that the communities which have attained to a conspicuous degree of civilization constitute a numerical minority of mankind. Contemporaneous with the rapidly advancing nations of Europe exist the sluggish nations of Asia, and the almost stationary tribes of Africa and Polynesia.

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[1] W. Adam, *Theories of History*, p. 87.

[2] "It is impossible for mere savages to civilize themselves. . . . Consequently men must at some period have received the rudiments of civilization

> "Better fifty years of Europe than a cycle of Cathay."

So irregular, indeed, has been the march of civilization, that most stages of progress may be made the subject of ocular investigation at the present day.

In the science of history, therefore, old "means not old in chronology, but in structure: that is most archaic which lies nearest to the beginning of human progress considered as a development, and that is most modern which is farthest removed from that beginning."[2]

Nevertheless, in spite of the fact that the career of progress has been neither universal nor unbroken, it remains entirely true that the law of progress, when discovered, will be found to be the law of history. The great fact to be explained is

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from a superhuman instructor." (!) Whately's *Rhetoric*, p. 94. A statement not altogether compatible with the one just quoted from the same author in the text.

[1] *Ancient Law*, p. 24; cf. Lewis, *Methods of Observation in Politics*, vol. i. p. 362.

[2] M'Lennan, *Primitive Marriage*, p. 9.

either the presence or the absence of progress. And when we have formulated the character of progress, and the conditions essential to it, we have the key to the history of the stationary as well as of the progressive nations. When we are able to show why the latter have advanced, the same general principle will enable us to show why the former have not advanced. Though in biogeny we habitually view the process of natural selection as the process whereby higher organisms are slowly originated, the principle loses none of its importance because sundry species from time to time suffer deterioration, or remain stationary, or become extinct. When we know how it is that some species advance, we know how it is that other species do not advance. So, in the science of language, which is equally with sociogeny a science of development—being, indeed, neither more nor less than a quite special province of sociogeny—we rightly consider the main problem solved when we have explained the process of phonetic integration, by which languages ascend from the primary, through the secondary, to the tertiary stage of structure. It matters not that Chinese remains to this day a primary language, and that the numerical majority of languages have not yet become tertiary by completely fusing together the component roots of their words. The process by which languages pass from a lower stage to a higher remains none the less the fundamental phenomenon to be investigated, and when we have generalized the conditions under which this process takes place, we can explain its absence as well as its presence. Now the case is the same with progress in society, that it is with progress in language or in organic life. Whether manifested or not manifested in any particular community, progress is still the all-important phenomenon to be investigated. It is the one grand phenomenon, to explain the presence and the absence of which, is to explain the phenomena of history. Just as the study of the languages which have advanced furnishes us the key for understanding those which have not advanced, so the study of the progressive communities furnishes us, as we shall see, the law of history; a law which, in its most general expression, covers the phenomena presented by the non-progressive communities likewise. Comte was therefore right in restricting the main current of his inquiry to the course of that civilization which began on the eastern shores of the Mediterranean, and has extended over Europe and a portion of America. The same plan will be pursued in the present chapter. Although incidental confirmation will be sought in the history of the stationary communities, our main problem will be to formulate the law of progress from a comparison of the phenomena presented by the progressive communities.

But before we can fairly enter upon our task, it will be desirable for us to note the Factors of Progress with which we shall chiefly have to deal.

The prime factors in social progress are the Community and its Environment. The environment of a community comprises all the circumstances, adjacent or remote, to which the community may be in any way obliged to conform its actions. It comprises not only the climate of the country, its soil, its flora and fauna, its perpendicular elevation, its relation to mountain-chains, the length of its coast-line, the character of its scenery, and its geographical position with reference to other countries; but it includes also the ideas, feelings, customs, and observances of past times, so far as they are preserved by literature, traditions, or monuments; as well as foreign contemporary manners and opinions, so far as they are known and regarded by the community in question. Thus defined, the environment may be very limited or very extensive. The environment of an Eskimo tribe consists of the physical circumstances of Labrador, of adjoining tribes, of a few traders or travellers, and of the sum-total of the traditions received from ancestral Eskimos. These make up the sum of the cond [illegible] ecting the social existence of the Eskimos. The environment of the United States, on the other hand, while it comprises the physical conditions of the North American continent, comprises also all contemporary nations with whom we have intercourse, and all the organized tradition—political and ethical, scientific and religious—which we possess in common with all the other communities whose civilization originated in the Roman Empire. The significance of this increase of size and diversity in the environment will be explained presently.

Bearing in mind this definition of a social environment—which I believe carries with it its own justification—let us briefly notice the error committed by those writers who would fain interpret all the most important social phenomena as due, solely or chiefly, to physical causes. This is an error frequently committed by physiologists who try their hand at the investigation of social affairs, and who attempt to treat sociology as if it were a mere branch of biology. But this is not the case. As we have seen psychology to be an offshoot from biology, specialized by the introduction of inquiries concerning the relations of the percipient mind to its environment; we must similarly regard sociology as an offshoot from psychology, specialized by the introduction of inquiries concerning the relations of many percipient and emotionally-incited minds to each other and to their common environment. As in biogeny all attempts to discover the law of organic development failed utterly so long as the relations of the organism to physical environing agencies were alone studied, and succeeded only when Mr. Darwin took into account the relations of organisms to each other; so still more inevitably in sociogeny must all our efforts fail so long as we consider merely the physiologic relations of a community to the country in which it dwells, and refuse to recognize the extent to which communities influence each other by means that are purely intellectual or moral. Doubtless the character of the physical environment is of importance, more especially, perhaps, in the earlier stages of civilization. No doubt civilization will first arise, other things equal, in a locality where food and shelter can be obtained with a medium amount of exertion; where nature is neither too niggard nor too lavish in the bestowal of her favours. No doubt there is a physical significance in the fact that civilization began, not in barren Siberia, or in luxuriant Brazil, but in countries like Egypt and Mesopotamia, which were neither so barren as to starve, nor so luxuriant as to spoil, the labourer. No doubt the Greeks owed much to the extent of their coast-line. No doubt—above all—the Mediterranean is justly sacred to the student of history as partly the civilizer of the peoples who upon its waves first courted adventure, and conducted commerce, and imparted to each other cosmopolitan sympathies which could never have been evoked but for some such intercourse. All this may be granted. But as civilization advances, the organized experience of past generations becomes to a greater and greater extent the all-important factor of progress. As Comte expresses it, in one of his profoundest aphorisms, the empire of the dead over the living increases from age to age. If we contemplate, from a lofty historical point of view, the relative importance of the factors in the environment of our United States, I believe we shall be forced to conclude that the victory of the Greeks at Marathon, the conquest of Gaul by Cæsar, the founding of Christianity, the defeat of Attila at Châlons and of the Arabs at Tours, the advent of the Normans in England, the ecclesiastic reforms of Hildebrand, the Crusades, the revolt of Luther, the overthrow of the Spanish Armada, and the achievements of scientific inquirers from Archimedes to Faraday, have influenced and are influencing our social condition to a far greater extent than the direction of the Rocky Mountains, or the position of the Great Lakes or the course of the Gulf Stream. Or if we inquire why the Spaniards are still so superstitious and [illegible] I believe we shall find little enlightenment in the fact that Spain is peculiarly subject to earthquakes, but much enlightenment in the fact that for eight centuries Spain was the arena of a life-and-death struggle between orthodox Christians and Moorish unbelievers.

The mention of Spain and earthquakes brings me to Mr. Buckle, a writer of marked ability, who, though he did not explicitly countenance the error I am here criticizing, was nevertheless sometimes betrayed into committing it, as may be seen from the following passage:—"The Arabs in their own country have, owing to the extreme aridity of their soil, always been a rude and uncultivated people; for in their case, as in all others, great ignorance is the fruit of great poverty. But in the seventh century they conquered Persia; in the eighth century they conquered the best part of Spain; in the ninth century they conquered the Punjab, and eventually nearly the whole of India. Scarcely were they established in their fresh settlements, when their character seemed to undergo a great change. They who in their original land were little else than roving savages, were now for the first time able to accumulate wealth, and, therefore, for the first time did they make some progress in the arts of civilization. In Arabia they had been a mere race of wandering shepherds; in their new abodes they became the founders of mighty empires,—they built cities, endowed schools, collected libraries; and the traces of their power are still to be seen at Cordova, at Bagdad, and at Delhi."[1] To exhibit the utter superficiality of this explanation, we have only to ask two questions. First, if the Arabs became civilized *only* because they exchanged their native deserts for Spain, Persia and India, why did not the same hold true of the Turks, when they exchanged their barren steppes for the rich empire of Constantinople? Though they have held for four centuries what is perhaps the finest geographical position on the earth's surface, the Turks have never directly aided the progress of civilization. Secondly, how was it that the Arabs ever came to leave their native deserts and to conquer the region between the Pyrenees and the Ganges? Was it because of a geologic convulsion? Was it because the soil, the climate, the food, or the general aspect of nature, had undergone any sudden change? One need not be a profound student of history to see the absurdity of such a suggestion. It was because their minds had been greatly wrought upon by new ideas; because their conceptions of life, its duties, its aims, its possibilities, had been revolutionized by the genius of Mohammed. The whole phenomenon requires a psychological, not a physical, explanation.

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[1] *History of Civilization*, vol. i. p. 42.

The environment in our problem must, therefore, not only include psychical as well as physical factors, but the former are immeasurably the more important factors, and as civilization advances their relative importance steadily increases. Bearing in mind these preliminary explanations, let us now address ourselves to the problem of social evolution, applying to the solution of it sundry biological principles established in previous chapters. We have first to observe that it is a corollary from the law of use and disuse, and the kindred biologic laws which sum up the processes of direct and indirect equilibration, that the fundamental characteristic of social progress is *the continuous weakening of selfishness and the continuous strengthening of sympathy.* Or—to use a more convenient and somewhat more accurate expression suggested by Comte—it is a gradual supplanting of *egoism* by *altruism.*

In the course of our inquiry into the causes of organic evolution, it was shown that all the processes cooperating in the development of higher from lower forms of life, are in the widest and deepest sense processes of equilibration.[1] The all-important truth was there demonstrated, that the progress of life on the earth has been the continuous equilibration of the organism with its environment. In the maintenance of such an equilibrium life has been shown to consist. Accordingly, as we have seen, if the environment is suddenly and violently altered, the organism perishes; but when it is altered slowly, the organism slowly adapts itself to it. If the adaptation is not completed within a single generation, nevertheless a sufficient number of generations will complete it, just as the children and grandchildren of an emigrant become more and more thoroughly acclimated to their new home.

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[1] See above, chapters xii. and xiii.

It is now to be shown that civilization is a slow process of breeding, of adaptation, of acclimatization—mental and moral, as well as physical,—of equilibration between the Community and the Environment. From age to age the environment is slowly but incessantly changing, and to its gradual changes the human race, embodied in communities, is continually adapting itself. As just observed, I am not referring to the physical environment alone; for in dealing with society we have to take into the account those psychological factors which have been shown to be by far the most considerable of all. Leaving out of the account all minor considerations of climate, food, or other physical circumstances, and looking at the psychological factors alone, we must admit that the environment is slowly but constantly changing. Every city that is built, every generalization that is reached, every invention that is made, every new principle of action that is suggested, alters in some degree the social environment,—alters the sum-total of external relations to which the community must adjust itself by instituting new internal relations. The entire organized experience of each generation, so far as it is perpetuated by literature or oral tradition, adds an item to the environment of the next succeeding generation; so that the sum-total [illegible] the circumstances to which each generation is requi[illegible] conform itself, is somewhat different from the s[illegible] oftenest called into play in the habitual occupations of life, will be most active and will overbalance the altruistic feelings. While, on the other hand, as the kindlier sympathies are but nascent, even the altruistic feelings, such as they are, will be strongly tinged with egoism. The highest emotion attainable will be clannishness, and the highest rule of duty will be that which enjoins loyalty to the tribal patriarch. This is actually found to be the emotional and ethical condition of primitively organized communities, wherever they have been attentively studied by competent observers. Such, for example, has been the state of things existing from time immemorial among the American Indians, among the Polynesians, and among the Arabs of the desert; and these aspects of clan-society, in a somewhat later stage, among the Scottish Highlanders, are well pourtrayed in several of the Waverley Novels.

Now what is it that chiefly determines the slow development of the altruistic feelings and the gradual atrophy of the egoistic feelings? Obviously it is the growth of the community in size and complexity,—the gradual enlargement of the area over which the altruistic feelings extend, and the gradual increase in the number of social situations which demand the exercise of those feelings. These conditions are partly fulfilled when the tribal community grows to a vast size, remaining structurally a tribe with a patriarchal head,—as was the case in ancient Egypt, Assyria, Persia and India, and as is still the case in China. But they are still better fulfilled when the community increases in the complexity of its internal relations, and, instead of remaining a tribe, becomes a federation of civic bodies, as in ancient Greece, or a single great civic body, uniting various tribal elements, as in ancient Rome. In each of these cases, the increased power of self-protection renders warfare less necessary and frequent, and the partial supplanting of the primitive predatory life by the occupations of agriculture and trade begins to make men more and more dependent on one another over a [illegible] wider area and to create a whole class of interests [illegible] warfare and destructiveness are more and more [illegible]. And in the latter case, where the community assumes a [illegible] character, the rise of a genuine political life [illegible] men operate on each other by indirect compulsion [illegible] persuasion, rather than by direct and brutal compulsion [illegible] the highest attainable ethical feeling is no longer [illegible] but patriotism, in the exalted sense in which that word was understood by the Greeks and Romans. Note [illegible] the influence of this high ethical feeling, even [illegible] loses its primitive purely egoistic character, and [illegible] school of self-discipline and self-sacrifice, [illegible] slight degree the altruistic feelings. If we compare [illegible] paigns of Marathon and Thermopylai with [illegible] a band of Highlanders in execution of [illegible] with the excursion of a party of Red Indians on the [illegible] path, we shall find no difficulty in realizing [illegible] considerations.

But, like other phenomena [illegible] are not sharply marked off [illegible] selfish as well as a sympathetic [illegible] standing the word always as the [illegible] stood it.) At the one extreme [illegible] clannishness; at the other extreme [illegible] to resemble cosmopolitanism. As long as the [illegible] structure of society lasted, the clannish [illegible] tinctly present in patriotism. Greek history, after the expulsion of the Persians, is the history of the struggle between the higher and the lower patriotism,—between the two feelings known to the Greeks as [illegible] Hellenism and Autonomism, represented respectively by [illegible] and by the Doric communities. The [illegible] of Thukydides tells us how autono[illegible] entailing the moral and political failure [illegible]

But when Rome had extended her beneficent sway over all the precincts of the Mediterranean, uniting communities hitherto autonomous and hostile by common interests of culture and of commerce, and bringing aggressive warfare to an end in the *Pax Romana*, then there became possible a cosmopolitan spirit, a Christian feeling, which regarded all men as legally and ethically equal,—equal before the Emperor, and equal before God. To trace the slow growth of this feeling in the annals of Roman law and of Stoic philosophy, and to observe its culmination in the genesis of Christianity,[1] is to obtain the key to Roman history.

But great political changes were necessary before Rome could carry to the end its great work,—partly because it had increased in size so much faster than it increased in structure. It crushed autonomism too rapidly. It developed imperialism at the expense of nationality. And hence the time at last arrived when the mutual cohesion of its provinces became too slight to withstand those barbaric assaults from without, which—as we should be careful to remember—had all along been intermittently attempted from the days of Brennus to those of Alaric. For a time, European society seemed likely to disintegrate into a set of tribal communities. But the old Empire had done its work too thoroughly for that. Roman principles, embodied in the Catholic Church, and in the renovated Empire of Charles the Great, exerted an organizing power which prevailed over the spirit of clannish isolation, and by effecting the grand series of compromises which we vaguely designate as the feudal system, laid the basis of modern society.

If now we examine the ethical circumstances of that vast modern fabric which has been reared upon material supplied in the older days of Rome—and which owes so much of its permanent character to the labours of the great Catholic and Imperial statesmen of the Middle Ages—we shall find that the process here described has been continually going on. For the primitive normal state of warfare there has been gradually substituted a normal state of peace. While in primitive times the interests of men were supposed to coincide only throughout the limited area of a petty clan, they are now seen to coincide throughout vast areas, and the railway, the steamship, and the telegraph are daily bringing communities into closer union, and, as George Eliot well expresses it, "making self-interest a duct for sympathy." The spirit of Christianity, first rendered possible by Roman cosmopolitanism, has made, and is ever making, wider and deeper conquests as civilization advances. By the primitive savage moral duties were imperfectly recognized, but only within the limits of the clan. By the Greek the ethical code was enlarged, but it was a code not applicable to barbarians. The mediæval Christian had a still longer list of duties owed by him to all mankind, his brethren in the sight of God; and to the ancient conception of justice thus materially widened, he added, in elementary shape, the conception of benevolence or the "enthusiasm of humanity;" but the familiar maxim that "no faith need be kept with heretics" shows that even to his conception of duty there were practical limits narrower than would now be admitted. The modern, on the other hand, recognizes that he owes certain duties to all men with whom he may be brought into contact, not because they are his kindred, or his neighbours, or his countrymen, or his fellow-Christians, but because they are his fellow-men. Such is our ethical standard, however imperfectly conformed to; and neither ancient nor mediæval had such an ethical standard. Compare also the ideal types of perfect manhood at the two extremes of civilization within our ken. The primitive type is the man of intense personality, with an enormous sense of his own importance, easily roused to paroxysms of anger, brooking no contradiction, disregardful of the feelings of others, domineering over all within his reach. The modern type is the man of mild personality, shunning the appearance of self-assertion, slow to anger, patient of contradiction, mindful of the feelings of those about him, unwilling to "make trouble." Such is the contrast between the typical ancient and the typical modern; and it implies a prodigious alteration in the dominant ethical feelings of the progressive portion of our race.

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[1] Of course it is not meant to imply that other elements were not at work in the genesis of Christianity. The growth of what Matthew Arnold calls the "spirit of Hebraism," not in Judæa merely, but throughout the Græco-Roman world, is an interesting phenomenon in this connection, but the treatment of it does not fall within the scope of the present exposition.

This change, as we now see, has been wrought by the slow but incessant modification of the social environment to which each generation of men has had to conform its actions. The altruistic feelings, finding at each successive epoch a wider scope for action, have become gradually strengthened by use; while the egoistic feelings, being less and less imperatively called into play, have become gradually weakened by disuse. And this change in the environment we perceive to have been wrought by the continuous growth of the community in size and complexity. Where, as among stationary tribes of savages, there has been no such growth, there the moral type of the primeval man is still to be found; and where, as among the stationary communities of Asia, there has been growth in size without corresponding growth in complexity, there the moral type is intermediate between that of the barbarian and that of the inheritor of Roman civilization. Thus the progress of society is a mighty process of equilibration or adjustment, in the course of which men's rules of action and emotional incentives to action become ever more and more perfectly fitted to the requirements arising from the circumstance of their aggregation into communities.

Here we have arrived at a rudimentary conception of the law of social progress, so far as it can be obtained from a comprehensive historical induction, aided and verified by deduction from a few fundamental truths of biology. The foregoing discussion has brought out one point of fundamental importance, in which the development of social life agrees with the development of organic life : both are continuous processes of adjustment or equilibration. But in all this there is nothing more than might have been anticipated. Since the phenomena of society are really but the phenomena of life, specialized by the addition of new groups of circumstances ; we must expect to find that the law of social evolution will be identical with the law of organic evolution, save only that it will require an all-important additional clause to express the results of the action of the superadded circumstances. Let us then seek to ascertain definitely,—*first*, in what respects the two kinds of evolution agree, and *secondly*, in what respects they differ.

In the first place the evolution of society, no less than the evolution of life, conforms to that universal law of evolution discovered by Mr. Spencer, and illustrated at length in earlier chapters. The brief survey just taken shows us that social progress consists primarily in the integration of small and simple communities into larger communities that are of higher and higher orders of composition ; and in the more and more complete subordination of the psychical forces which tend to maintain isolation, to the psychical forces which tend to maintain aggregation. In these respects the prime features of social progress are the prime features of evolution in general.

In the second place, the progress of society exhibits those secondary features of differentiation and integration which evolution universally exhibits. The advance from indefinite homogeneity to definite heterogeneity in structure and function is a leading characteristic of social progress. On considering primitive societies, we find them affected by causes of heterogeneity except those resulting from establishment of the various family relationships. A Henry Maine has shown, in early times the family a the individual was the social unit. In the absence thing like national or even civic organization, each family chief was a monarch in miniature, uniting in his own person the functions of king, priest, judge, and parliament; yet he was scarcely less a digger and hewer than his subject children, wives, and brethren. Commercially, it is needless to say, all primitive communities are homogeneous. In any barbarous tribe the number of different employments is very limited, and such as there are may be undertaken indiscriminately by everyone. Every man is his own butcher and baker, his own tailor and carpenter, his own smith, and his own weapon maker. Now the progress of such a society toward a civilized condition begins with the differentiation and integration of productive occupations. That each specialization of labour entails increased efficiency of production, which reacting brings out still greater specialization, is known to every tyro in political economy. Nor is it less obvious that, with the advance of civilization, labour has been steadily increasing in coherent heterogeneity, not only with regard to its division among different sets of mutually-dependent labourers, but also with regard to its processes, and even its instruments. The distinguishing characteristic of modern machinery, as compared with the rude tools of the Middle Ages or the clumsy apparatus of the ancients, is its definite heterogeneity. The contrast between the steam-engine of to-day and the pulleys, screws, and levers of a thousand years ago assures us that the growing complexity of the objects which labour aims at is paralleled by the growing complexity of the modes of attaining them. Turning to government, we see that by differentiation in the primeval community some families acquired supreme power, while others sank, though in different degrees, to the rank of subjects. The integration of allied families into tribes, and of adjacent tribes into nations, as well as that kind of integration exhibited at a later date in the closely-knit diplomatic inter-relations of different countries, are [illegible] steps in social progress. Next may be mentioned [illegible] entiation of the governing power into the civil and the ecclesiastical; while by the side of these ceremonial government grows up insensibly as a third power, regulating the minor details of social intercourse none the less potently because not embodied in statutes and edicts. Comparing the priests and augurs of antiquity with the dignitaries of the mediæval Church, the much greater heterogeneity of the latter system becomes manifest. Civil government likewise has become differentiated into executive, legislative, and judicial. Executive government has been divided into many branches, and diversely in different nations. A comparison of the Athenian popular government with the representative systems of the present day shows that the legislative function has no more than any of the others preserved its original homogeneity. While the contrast between the *Aula Regis* of the Norman kings and the courts of common law, equity, and admiralty,—county courts, queen's courts, state courts, and federal courts,—which are lineally descended from it, tells us the same story concerning the judicial power. Nor should it be forgotten that the steady expansion of legal systems, to meet the exigencies which civilization renders daily more complex, is an advance from relatively indefinite homogeneity to relatively definite heterogeneity.

Obviously, however, our task is not completed when we have pointed out this general coincidence between the development of society and the development of life. Nor can the universal law here illustrated be the special law of social progress for which we are seeking. By reason of its very comprehensiveness, the law of universal evolution cannot be regarded as supplying the precise kind of information we desire concerning the relations of social to organic phenomena. By its aid we have found it possible to inter [illegible] only the development of life, intelligence, and [illegible] the genesis of planetary systems and [illegible]. It is therefore the law not only of social, psychical, and vital changes, but also of inorganic changes. Underlying all the sciences of genesis, and fusing them into one grand science of cosmogony, it utters no truth concerning organic or social development which is not equally true of all development. Thus while it is indeed, in the deepest sense, the ultimate law to which organic and super-organic changes conform, it is silent respecting the differential characteristics by which these changes are distinguished from inorganic changes. Already in treating of the evolution of life we saw that the ultimate and general formula needed to be supplemented by a derivative and special formula, which should describe organic development in terms inapplicable to inorganic phenomena. And this formula we found in the definition of life as the continuous adjustment of inner to outer relations, upon which also was afterwards based our entire theory of the evolution of intelligence.

Now the historic survey into which we were led a moment ago, while inquiring into the progress of moral feelings, showed us that, in this respect also, the evolution of society agrees with the evolution of life in general. The progress of a community, as of an organism, is a process of *adaptation*, —a continuous establishment of inner relations in conformity to outer relations. If we contemplate material civilization under its widest aspect, we discover its legitimate aim to be the attainment and maintenance of an equilibrium between the wants of men and the outward means of satisfying them. And while approaching this goal, society is ever acquiring in its economic structure both greater heterogeneity and greater specialization. It is not only that agriculture, manufactures, commerce, legislation, the acts of the ruler, the judge, and the physician, have since ancient times grown immeasurably multiform, both in their processes and in their appliances; but it is also that this specialization has resulted in the greatly increased ability of society to adapt itself to the emergencies by which it is ever beset.

history of scientific progress is in like manner the history of an advance from a less complete toward a more complete correspondence between the order of our conceptions and the order of phenomena. Truth—the end of all honest and successful research—is attained when subjective relations are adjusted to objective relations. And what is the consummation of moral progress but the thorough adaptation of the desires of each individual to the requirements arising from the coexistent desires of all neighbouring individuals? Thus the phenomena of social and of organic progress are seen to correspond to a degree not contemplated by those thinkers who, from Plato to Hobbes, have instituted a comparison between them. The dominant characteristics of all life are those in which social and individual life agree.

Let us now examine more closely the relations between the Community and the Environment. From the twofold circumstance that life is high according as the organism is heterogeneous, and also according as it is adjusted to surrounding conditions, may be derived the corollary that *the heterogeneity of the environment is the chief proximate determining cause of social progress.* Thus we may understand why civilization advances so much more rapidly in modern than it did in ancient times.[1] As Sir Charles Lyell observes; "We see in our own times that the rate of progress in the arts and sciences proceeds in a geometrical ratio as knowledge increases, and so, when we carry back our retrospect into the past, we must be prepared to find the signs of retardation augmenting in a like geometrical ratio; so that the progress of a thousand years at a remote period may correspond to that of a century in modern times, and in ages still more remote Man would more and more resemble the brutes in that attribute which causes one generation exactly to imitate in all its ways the generation which preceded it." Thus the process is here the same in social and in organic life, Sir Charles Lyell already suspects; for he elsewhere observes that the lower the place of organic beings "in a graduated scale, or the simpler their structure, the more persistent are they in form and organization. In whatever manner the changes have been brought about, the rate of change is greater where the grade of organization is higher." And this fact results from the more complex relations of the higher beings to their environment. Applying these considerations to history, it will be seen that, owing to the political isolation of ancient communities, the heterogeneity of their environments must have been inconsiderable. Holding little intercourse with each other, and accommodating their deeds and opinions mostly to the conditions existing at home, their progress was usually feeble and halting. Owing to the enormous heterogeneity of the environment to which modern communities are forced to adjust themselves, progress in later ages has been far more rapid and far more stable than of old. The physical well-being of an ancient Greek was not enhanced by an invention made in China, nor could his philosophy derive useful hints from theories propounded in India. But in these days scarcely anything can happen in one part of our planet which does not speedily affect every other part. The physical environment of a modern European extends over a great part of the earth's surface, and his psychical environment is scarcely limited in time or space. His welfare is not unfrequently affected by accidents occurring at the antipodes, while his plans for the coming year are often shaped with conscious or unconscious reference to events which happened centuries ago. That the rapid and permanent character of modern progress is in great measure due to this circumstance, will be denied by no one. And thus is explained the wonderful civilizing effect of various events which have from time to time brought together distant sections of mankind; [illegible] which it will be sufficient merely to na

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[1] [illegible] *Antiquity of Man*, p. 377.

Alexander, the spread of Roman dominion, the Arabian conquests, the Crusades, and the voyages of Columbus, Magellan, and De Gama. The invention of printing, increasing the rapidity and the frequency with which the thoughts of various minds are brought into contact, offers another illustration; and in a similar way is to be explained the civilizing agency of railroads and telegraphs.

Comparing these deductions with the historical survey of ethical development above taken, we arrive at a set of mutually harmonious conclusions. We see that the process of intellectual and moral adaptation which constitutes social progress is determined by the steadily increasing heterogeneity of the social environment. And we see that this increased heterogeneity of the environment is caused by the integration or growing interdependence of communities that were originally isolated. We have now to examine this process of integration somewhat more in detail. By instituting a novel comparison between the processes of organic and of social life, we shall be led directly to the special law of progress for which we are seeking.

Observe first that the living beings which are lowest, or next to the lowest, in the scale of organization—as, for example, the protococcus and the amœba—are nothing but simple cells. It has been shown, by Mr. Spencer, that progress in morphological composition, both in the animal and in the vegetable kingdoms, consists primarily in the union of these simple cells into aggregates of higher and higher orders of complexity. Now in the study of social evolution we are met by precisely similar phenomena. Let us consider what is implied by the conclusions at which Sir Henry Maine has arrived, in his profound treatise on "Ancient Law," by an elaborate inquiry into early ideas of property, contract, and testamentary succession, and into primitive [illegible] legislation. "Society in ancient times," [illegible] was not what it is assumed to be at present, a collection of *individuals*. In fact, and in the view of the men who composed it, it was an aggregation of *families*. The contrast may be most forcibly expressed by saying that the *unit* of an ancient society was the *family*, of a modern society the *individual*."[1] But originally the family-government excluded not only individual independence, but also state supremacy. The sole government actual or possible was that exercised by the male head of a family-group. By slow stages various family-groups closely akin in blood appear to have become integrated into tribes or clans, community of descent being still the only conceivable bond which could hold together a number of individuals in the same political aggregate. At a later stage the limits of the tribe were further enlarged by the important legal fiction of "adoption," or the pretence that newly-added members were descended from some conspicuous common ancestor of the tribe. Vestiges of a time when there were no aggregations of men more extensive than the tribal community thus constituted, and when there was no sovereign authority save that exercised by the head of the tribe, may be found in every part of the world,[2] and among totally-savage races this state of things still continues. Now we shall find something more than an instructive analogy in the comparison of the primitive family-group to a unicellular organism, for such a comparison will enable us to realize that in social and in organic evolution the process of integration has been substantially the same. The first well-marked stage in coalescence is the formation of the tribe or clan, which may be compared to those lowly organisms made up by the union of amœba-like units with but little specialization of structure or function. At this stage social organization is but one step removed from that aimless and ferocious anarchy which characterizes the non-social life of brutes. "Mistrust, jealousy, secret ambushes, and implacable vengeances" characterize the mutual relations of these social "aggregates of the first order." Hostility is the rule, and peace the exception. The repulsive forces are stronger and the cohesive forces weaker than at any subsequent period. As we have seen above, the selfish impulses which tend to maintain savage isolation are as yet unchecked save by instinctive loyalty within the tribal limits.

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[1] *Ancient Law*. p. 126.

[2] "The *γένος* of Athens, the *gens* of Rome, the *mark* or *gemeinde* of the Teutonic nations, the village community of the East . . . the Irish clan, are all essentially the same thing"—Freeman, *Comparative Politics*, p. 102.

See, among other authorities, Volney's *View of the United States*, p. 397; Phillipp on *Jurisprudence*, p. 207; Charles Comte, *Traité de Législation*, liv. iii., chap. 28; Grote, *History of Greece*, vol. iii., pp. 49—69; Gibbon (Paris edit.), vol. iii., p. 243; Vico, *Scien* *uova*, *Opere*, tom. iv., pp. 23, 35, 40; Aristotle, *Eth. Nikom.* viii. 14 *itus*, *Germania*, vii.; Cæsar, *Bell. Gall.* vi. 22, 23.

The coalescence of such tribes into civic communities is the formation of social "aggregates of the second order." For a long time these higher aggregates retain conspicuous traces of their mode of composition, as in Greece and Rome;[1] until increasing social heterogeneity obliterates the original lines of demarcation; while new divisions spring up, resulting from the integration of like parts, as is seen in the guilds of mediæval Europe, and still better in the localization of industries which marks the present time.

The coalescence of civic and tribal communities into the nation—an "aggregate of the third order"—is well exemplified in the history of France, which from a disorderly collection of independent baronies has passed by well-defined transitions into a perfectly integral nation. The attainment of this stage is indispensable to a career of permanent progress. As hinted above, the premature overthrow of the Hellenic political system is to be attributed to its very incomplete integration. An aggregate of the national type was in process of formation by the extensive coalescence of maritime cities under the leadership of Athens, when the Peloponnesian war intervened, vindicating the superiority of selfish autonomy, and showing by its result that the civilizing spirit of nationality was as yet too feeble to prevail.

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[1] The structure of the Amphiktyonic union shows "that the [illegible] cities with which we are so familiar in Grecian history grew out of [illegible] system of tribes." Freeman, *Comparative Politics*, p. 64. Further [illegible] in abundance, may be found in the succeeding pages of that excellent [illegible] which reads, from beginning to end, almost like a commentary [illegible] chapter.

It was first under Roman dominion that national aggregation and the feeling of national solidarity began to be brought to something like completeness. By absorbing nearly all the petty communities then existing within the limits of the Mediterranean world, and by gradually extending to their members the privileges of citizenship, Rome succeeded in dealing to the passion for autonomy a blow from which it has never recovered; while the enormous extent of the Empire, and its ethnic heterogeneity, imparted to the national spirit thus evoked, a cosmopolitan character destined to be of prodigious service to civilization. The influence of these circumstances upon the attitude of Christianity I have already alluded to, and it cannot be too strongly insisted upon. No human mind could have even conceived, much less have carried into execution, the idea of a universal religion, if the antique state of social isolation had not previously been brought to a close in universal empire. If Christianity had appeared four centuries earlier than it did, it would, like Buddhism, have assumed the garb of a local religious reformation. Or if it could have aimed at anything higher and more comprehensive than this, its preaching would have fallen upon ears not ready to receive it. All the Oriental enthusiasm, all the Hellenic subtlety, of Paul, could have effected nothing, had he visited Athens in the days of Plato and Diogenes. But the cosmopolitan element in Roman civilization was just that which Christianity most readily assimilated, and which it intensified by setting up a new principle of comm [illegible] primeval principle of community of race. From this happy concurrence of circumstances there was formed, upon the ruins of Paganism, that religious organization which alone, of all churches that have existed, has earned the glorious name of Catholic. Disgusted at some of her high-handed proceedings in later times, Protestant historians have too generally forgotten that the Roman Church, by co-ordinating the most vigorous and progressive elements of ancient life, prepared the way both for the ubiquity and for the permanence of modern civilization. Had the ecclesiastical system of the Empire perished, along with the breaking up of its political system; had there been really that wreck of ancient institutions in the fifth century which was formerly supposed to have occurred, until Mr. Bryce and Mr. Freeman dispelled the gross error; it is difficult to see how mediæval European history could have been politically anything more than a repetition of Grecian history, save only in the extent of its geographical range. Whoever is disposed to doubt so emphatic an assertion will do well duly to ponder the fact that the newly-arriving Teutonic subjects of the Empire (who would, in such case, have come as foreign conquerors) had not advanced beyond the stage of tribal organization. On their further aggregation into rural and civic bodies, the autonomous spirit would have acquired an ascendency which it might well have taken another more fortunate Athenian federation, or another all-absorbing Roman domination, thoroughly to destroy. Even as it was, it required all the immense power of the Church, unflinchingly exercised through many generations, to prevent European society from disintegrating into a mere collection of mutually repelling tribal communities. But the Church not only preserved the best social results of Roman dominion, by hastening the consolidation of each embryonic nationality; it also, by its peculiar position as common arbiter between the different states thus arising, assisted in the formation of a new social aggregate of a yet higher order. The modern system of independent nationalities held in virtual federation—not by international codes, but by the possession of guiding principles of conduct more or less heartily reverenced by all—is chiefly the work of the Roman Church. Here, finally, we have reached a system whose structure bears in the highest degree the marks of permanence. It is sustained by the ever-deepening sentiments of cosmopolitan philanthropy and universal justice,—the most cohesive of social forces, as the spirit of local selfishness was the most disruptive.

Here it might seem that we have obtained all the data requisite for enunciating our law of social progress. But something is still wanting. Our law of progress, if now enunciated, would be too general. It would cover alike the phenomena of social and of organic life. In both there is an advance from indeterminate uniformity to determinate multiformity; in both there is a continuous adaptation of the organism or the community to its environment; and in both there is a continuous integration, entailing an advance from incoherence to coherence of structure. We must now start in search of that all-important clause which shall express the essential difference between organic and social progress.

In the ancient family-community, as delineated by Sir Henry Maine, the separate existence of the individuals was almost submerged and lost in the corporate existence of the aggregate. Personal freedom was entirely unrecognized. To family duties all individual rights were subjected. By a tie, religious no less than political, the members of the family were all held in allegiance to its oldest male representative. The father might abandon his son in infancy, and when grown up might sell him as a slave, or put him to death for disobedience. And the wife was to an equal extent in the power of her husband, to whom she legally stood in the relation of a daughter, so that marriage was but the ex-

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in the more or less complete recognition of individual rights and obligations. On the rise of the feudal system, the relations of vassal to suzerain were, through the influence of Roman conceptions, extensively regulated by contract; and it is in this respect that the feudal institutions are most widely distinguished "from the unadulterated usages of primitive races."[1] It was, I believe, mainly owing to this that the integration of feudal lordships into nations was accompanied by the enlargement of individual liberty to a much greater extent than the integration of ancient clans, gentes, and phratries into civic communities. The Roman Church also aided in promoting the freedom of individuals, as well as in facilitating the consolidation of states. By the more or less strict enforcement of clerical celibacy, it maintained in the midst of hereditary aristocracy a comparatively democratic organization, where advancement largely depended upon moral excellence or intellectual ability. And preserving, by the same admirable institution, its independence of feudal patronage, it was often enabled successfully to interpose between the tyranny of kings and the helplessness of subjects. To ecclesiastical celibacy, more than to almost any other assignable institution, we owe our emancipation from ancient patriarchal conceptions of social duty. The development of industry, crossing in various ways the antique divisions of society, has contributed to the same result; until, in modern times, the primitive mode of organization is almost entirely effaced, leaving but few barely traceable vestiges. Individual rights and obligations, from being nothing, have come to be all in all. While originally the individual was thought to exist only for the sake of the state, the state is now regarded as existing only for the sake of the individual.

It will thus be seen that the very same process, which has resulted in the formation of social aggregates of a higher and higher order, has also resulted in the more and more com subordination of the requirements of the aggregate to requirements of the individual. And be it further not that the relative strength of the altruistic feelings maintain the stability of the highest social aggregation, i tains also to the fullest extent the independence of its vidual members; while the relative strength of the feelings which in early times prevented the existence higher organization than the family or tribe, was also compatible with individual freedom of action. Now th precisely the reverse of the state of things which we fin organic evolution. In organic development, the individu life of the parts is more and more submerged in the porate life of the whole. In social development, corp life is more and more subordinated to individual life. highest organic life is that in which the units have the possible freedom. The highest social life is that in the units have the greatest possible freedom. This fea social evolution is most conveniently described by Sch term *individuation*, which is employed in a kindred sense both in Mr. Spencer's and in other modern works on biology.

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[1] Maine, op. cit. p. 365.

Thus we have at last reached the conclusion in quest of which we set out. Supplementing our previous results, according to which organic and social evolution were seen to agree, by our present result, according to which they are seen to differ, we obtain a formula for social evolution which may be regarded as fundamentally accurate. We obtain the Law of Progress, which may be provisionally stated as follows:—

"*The Evolution of Society is a continuous establishment of psychical relations within the Community, in conformity to physical and psychical relations arising in the Environment; during which, both the Community and the Environment pass from a state of relatively indefinite, incoherent homogeneity to a state of relatively definite, coherent heterogeneity; and during* *which, the constituent Units of the Community become ever more distinctly individuated.*"

In the next chapter I shall proceed to show how this exceedingly general and technical formula includes and justifies whatever is defensible in sundry less abstract generalizations, expressed in more popular language, by Comte and Buckle. We shall be called upon to pass in review certain phases of social evolution, and to criticize, with the aid of the theorems now at our disposal, the claims of Comte to be regarded as the founder of sociology.

CHAPTER XIX.

ILLUSTRATIONS AND CRITICISMS.

THE discussion contained in the foregoing chapter has to what a notable extent the phenomena of social ev may be expressed, with the strictest accuracy, by for originally invented to describe the evolution of l general. Let us briefly review the results which w already obtained.

First, we saw that social as well as organic evolution consists in the continuous adaptation of the community, or organism, to the environment. Or, expressing the same thing in other words, social progress is a continuous establishment of inner relations in conformity to outer relations.

Secondly, we saw that in the course of this adaptation the community, like the organism, continually increases in definite heterogeneity, through successive differentiations and integrations.

Thirdly, we saw that in the community, as in the organism, the increase in internal heterogeneity is determined by the continuous increase of heterogeneity in the environment.

Fourthly, we saw that the increase of heterogeneity in the environment is determined by the successive integration of communities into more and more complex and extended aggregates. And this law [illegible] [illegible] of organic progress

These four generalizations, expressing the points in which social and organic development coincide, were summed up in the two first clauses of our law of progress. They are immediate corollaries of the law of universal evolution and of the definition of life as adjustment. They are not to be understood as mere expressions of striking analogies. They are to be understood as implying that the evolution of life and the evolution of society are, to a certain extent and in the most abstract sense, identical processes. Such a conclusion, indeed, became inevitable the moment we were brought to admit that the phenomena of society constitute but a specialized division of the phenomena of psychical life.

Nevertheless it would be a grave error to infer, from this necessary coincidence in development, that a community is nothing more than a kind of organism, as Plato imagined in his "Republic," and Hobbes in his "Leviathan." When we go so far as to compare the metropolis of a community to the heart of an organism, its roads to blood-vessels, its circulating commodities to circulating nutritive materials, its money to blood-corpuscles, its channels for transmitting intelligence to nerve-axes, and the individuals of which it is composed to physiologic units; we are instituting a series of analogies, which are no doubt of considerable value in the study both of history and of political economy. In his essay on the "Social Organism," Mr. Spencer has traced a great number of such analogies, which are no less instructive than curious, but they are after all analogies and not homologies. So when M. Littré points out that the study of political economy stands in the same relation to the science of sociology as the study of the nutritive functions to the science of biology, he reveals an analogy of great philosophical value. But we nevertheless feel that there is a wide distinction between an organism and a community, which it would be absurd to ignore; and Hobbes's conception of society as a vast Leviathan strikes us as grotesque.

in a remote future it comes to an end in proximate equilibrium. The increasing interdependence of human interests must eventually go far to realize the dream of the philosophic poet, of a Parliament of Man, a Federation of the World,

> "When the kindly earth shall slumber, lapt in universal law,"

and when the desires of each individual shall be in proximate equilibrium with the means of satisfying them and with the simultaneous desires of all surrounding individuals. Such a state implies at once the highest possible individuation and the highest possible integration among the units of the community; and it is the ideal goal of intellectual and moral progress.

Thus the fundamental law of progress, as formulated at the close of the last chapter, contains all the provisions requisite in such a formula. It describes, in a single grand generalization, all the phenomena of social evolution, both in so far as they result from the general laws of life, and in so far as they result from the operation of circumstances peculiar to the aggregation of intelligent organisms in a community. And it includes and justifies all the minor generalizations which may be reached by a direct induction from historical phenomena solely.

This law of progress we find to be exceedingly abstract: it expresses a general truth quite completely disengaged from the incidents of particular cases. Such, as we were led to anticipate, must be the character of a law which generalizes a vast number of complex phenomena. A formula which is to include in one expression phenomena so different as the rise of Christianity and the invention of the steam-engine must needs be eminently abstract. To attempt to make it concrete, so as to appeal directly to the historical imagination, would be to deprive it of its universality, to increase its power of expressing some one [illegible] of phenomena by rendering it powerless to express

This consideration explains the manifest failure of all the attempts which have been made to determine the general law of progress by a simple historical induction. Take, for example, the two crude generalizations which pretty nearly sum up the philosophy of history as it is contained in the work of Mr. Buckle; that "scepticism" is uniformly favourable to progress, while the "protective spirit" (or, the spirit of over-legislation) is uniformly detrimental to it. These, in the first place, are generalizations drawn from a peculiar and temporary phase of society and illegitimately extended to all phases of society; and, in the second place, even so far as they go, they have but a limited applicability,—expressing at best certain aspects of intellectual and industrial progress, but leaving quite out of sight that slow moral evolution which underlies the whole. Whatever of truth is contained in these statements is also contained in the formula which I am here expounding, and is much more accurately expressed in the terms of that formula. Scepticism, for instance, in the best sense of the word, is the attitude of mind which is caused by the perception that certain inner psychical relations—say, a given set of beliefs or institutions—have ceased to be adapted to outer relations. The mediæval conception of the world, as presented in Dante's treatise on "The Monarchy," was very closely adapted both to the knowledge and to the social needs of the time. The conception of man as the centre of a universe made solely for his use and behoof, with a sun to give him light by day and a moon and stars to give him light by night, with an Emperor and a Pope divinely appointed to rule him in this life, and an Autocrat in heaven uniting in himself the functions of these two, and ruling nature according to his arbitrary will; this conception, I say, was in harmony both with the best science and with the most urgent social requirements of the time, and the fact of its long duration shows how profound was [illegible]ony. While this state of things lasted, there was but little room for scepticism. But after a while the psychical environment had so far altered as to be out of balance with this conception of the world. The Copernican revolution unseated Man from his throne in the centre of the universe, and advancing physical generalization cast discredit upon the theory of providential government, and so arose the long line of "infidels" from Bruno and Vanini to Voltaire and Diderot. While, on the other hand, the increasing power of monarchy, especially in France, gradually undermined the moral independence of the Papacy, converting it from an upholder of equity and a friend of the people into an unscrupulous ally of regal usurpation and iniquity; and thus arose the Great Schism, followed by the Protestant revolt and the grand democratic movement which culminated in the French Revolution. Now what is all this infidel rebellion against dogma and democratic rebellion against authority, but the intellectual and moral turbulence caused by the growing conviction that the psychical relations comprised in the authorized conception of the world were out of balance with the new aggregate of relations formed by the discoveries of science and the altered requirements of social existence? And this painful attitude of the mind, prompting men to fresh investigation of the order of nature and to new social re-arrangements, is the stimulus to a new and closer adaptation.

Such is the function of scepticism in the community, and such also is its function in the individual. A person, for instance, is educated in an environment of Presbyterian theology, accepting without question all the doctrines of Calvinism. By and by his environment enlarges. Facts in science or in history, methods of induction, canons of criticism present themselves to his mind as things irreconcilable with his old creed. Hence painful doubt, entailing efforts to escape by modifying the creed to suit new mental exigencies. Hence eager study and further enlargement the environment, causing fresh disturbance of equilibrium and renewed doubt resulting in further adaptation. And so the process continues until, if the person in question be sufficiently earnest and sufficiently fortunate, the environment enlarges so far as to comprehend the most advanced science of the day, and the process of adaptation goes on until an approximate equilibrium is attained between the order of conceptions and the order of phenomena, and scepticism, having discharged its function, exists no longer, save in so far as it may be said to survive in the engrained habit of weighing evidence and testing one's hypotheses.

Now to say that scepticism is one of the causes of progress is to make a historical induction which is valuable as far as it goes; but it is at best an empirical generalization. To make it a scientific law, we need to express the function of scepticism in terms of some formula which covers all the phenomena of progress. And who does not see that in so expressing it we are obtaining a far more definite and accurate and serviceable notion than when we merely state vaguely that scepticism is a cause of progress?

Just so with the statement that the protective spirit is a hindrance to progress. By the colloquial phrase "protective spirit," Mr. Buckle means the control, or at least the undue control, of the community over its individual members. Now in estimating the effect of this circumstance upon progress, everything depends upon the precise amount of such control which we are to regard as excessive. But this varies with each epoch of civilization. What would now be intolerable despotism was once needful restraint. You cannot have a constitutional democracy of Vandals or Moguls. So long as men's altruistic feelings are not powerful enough to make [illegible] spontaneously respect the claims of their fellows, the [illegible] which [illegible] make society hold together is that [illegible] implicit obedience to the head [illegible] as we have already seen, the steady growth of altruism at the expense of egoism, which renders possible a more complete social aggregation, renders possible also a more complete development of individual liberty. So that what in one age is a needful control exercised by the community over its members becomes in the next age an undue control. All this is expressed in the law of progress, as here formulated; but it is not expressed, with any approach to accuracy, in the crude statement that the protective spirit is an obstacle to civilization.

Indeed the longer we study this general formula, the more we shall be convinced that it includes and justifies all sound inductions which can be derived from a survey of historical phenomena. As we apply it to the facts of history one after another, we shall see ever more clearly that its very abstractness is its excellence, and that the initial difficulty in thoroughly realizing its import arises from its very fulness of meaning. And we shall become ever more deeply impressed with the belief that no amount of mere historic induction can give us a universally applicable law of social progress, unless our results be deductively interpreted as corollaries from the general laws of life.

We are now in a position to exmaine the claims of Comte to be regarded as the founder of sociology. And first let us note that a law of social progress answering so many requirements as are met by the law above expounded could not have been obtained earlier than the present generation or even than the present decade.

To conceive of sociogeny as a specialized branch of psychogeny, itself a specialized branch of biogeny, was not possible until a general science of genesis had been at least partially instituted. The very idea of a science of genesis as applied to organic phenomena was not elaborated until the appearance of Von Baer's great treatise in 1829. And the conception was then altogether too novel t worked into the web of philosophy w ing. Considering how, throughout the latter part of his life, he steadfastly refrained from the study of contemporary scientific literature, I do not think it likely that Comte ever became aware of the growing prominence of this conception of genesis; and if he had become aware of it he would doubtless have scornfully repudiated it, as he repudiated almost every new conception which was distinctly in advance of the limited scientific knowledge of 1830. The knowledge which Comte was not prepared to utilize at that date, he was certainly not in a condition to utilize at any later period of his life. It was in 1857, the year of Comte's death, that Mr. Spencer, in an essay entitled "Progress: its Law and Cause," first definitely extended the law of organic development to historic phenomena; although he had ever since 1851 been visibly working toward that result, and had in 1855 reached that grand generalization of the development of both life and intelligence, regarded as processes of adjustment, which underlies the law of social progress here expounded. It was this splendid series of researches, culminating in the announcement of the universal law of evolution, in 1861, which supplied a new basis for all the sciences which treat of genesis, and rendered possible the discovery of the special laws of sociogeny. And finally, in 1861, the further clue to these special laws was given by Sir Henry Maine, whose immortal treatise on "Ancient Law" threw an entirely new light upon the primitive structure of society, and demonstrated—what before could only have been surmised—that human society, as earliest organized, consisted of a congeries of tribal communities by the integration of which have arisen the various orders of states and federations known to history.

When, therefore, we inquire whether Comte did or did not create a [illegible], we need not be surprised if it appear that [illegible] such a science. For in sociology, [illegible] science, the prime requisite is to formulate the law of evolution—in this case, the order of sequence of historic events from epoch to epoch. So far as a science of society could be founded upon purely statical considerations, the work had already been performed; by Adam Smith, as regards political economy, by Bentham, as regards jurisprudence, and by both these great thinkers, as regards ethics. But ethics, jurisprudence, and political economy, put together, do not make up a science of society, as Comte clearly saw. For in sociology the historical element—the question whence we started and whither we are bound—is the element which takes precedence of all others. Even ethics, jurisprudence, and political economy cannot be placed upon a truly rational basis until we understand the order of intellectual and moral change from epoch to epoch. To understand the "tendencies of the age" is an indispensable pre-requisite for sound sociological thinking as well as for sound political acting. Thus that portion of sociology which treats of genesis is, relatively to the whole science, even more important than the corresponding portions of biology and psychology. In biology pure and simple, we can, as we have seen, obtain a tolerably complete notion of the order of changes in the organism, with but occasional reference to the comparatively stable and unchanging environment. In psychology we have to take the environment into account at every step; but unless we are studying the quite special problem of the growth of the mental faculties, we do not need to refer to a definite and persistent succession of changes in the environment. But in sociology we cannot work in this way. As M. Littré has well pointed out, when we come to study humanity we are met by a new phenomenon unknown in biology or in psychology pure and simple. That new phenomenon is Tradition, or the bequeathing of all its organized intellectual and moral experience by each generation to its successor. Here for the first time we have an environment which is rapidly changing in a definite order of sequence, and changing by the very activity of the community itself. The organized experience of each generation becomes a part of the environment of its successor; and since in each successive age "the empire of the dead over the living increases," the environment of each generation consists to a greater and greater extent of the sum-total of traditions bequeathed by all past generations. Hence we cannot hope scientifically to comprehend the simplest feature in any given state of the community without reference to ancestral states. The religious phenomena of the present day, for example, cannot be understood without previous knowledge of the whole history of Christianity, and indeed of human speculative thought since men began to be aware of the universe about them. Our political organization can be scientifically interpreted only as the offspring of ancestral political organizations in a series reaching back to the primitive tribal community.[1] And so with all the aspects of society. Whether we are studying a creed, a code of laws, a dialect, a system of philosophy, a congeries of myths, or a set of manners and customs, we can arrive at the rational solution of our problem only through a historical inquiry. Hence the doctrine of genesis, indispensable as it is in the other two organic sciences, becomes, if one may say so, even more indispensable in sociology. Here the whole science rests upon sociogeny, and until we have reached a scientific conception of progress we cannot stir a step.

Thus, in addition to the unparalleled complexity of its phenomena, and to its general dependence both for doctrine and for method upon the simpler sciences, we perceive still another reason why the science of sociology has been the last to be constituted. Resting as it does upon the law of progress, it has had to wait not only until the preceding sciences were founded, but until they were sufficiently advanced to supply it with the general formula of organic development, from which alone the law of social progress could be deduced. It was not enough that Bichat had laid the foundations for a general theory of nutrition, reproduction and innervation, or that James Mill had established the fundamental laws of association; though this was indeed much. The new science had to wait until Von Baer had traced the order in which organisms develope, until Mr. Darwin had shown how through heredity and natural selection organisms become adapted to their environments, and until Mr. Spencer had shown how associated ideas and emotions are slowly generated and modified in conformity to surrounding circumstances.

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[1] See Mr. Freeman's book, *Comparative Politics*,—the work of a [illegible] scholar who inherits the gift of Midas, and makes gold of every [illegible] he touches.

All this, of course, could not be foreseen by Comte. But he nevertheless clearly saw—and it does honour to his philosophic acumen—that a comprehensive theory of social changes can be obtained only by studying them in the order of their historical dependence. He saw that the laws of sociology are at bottom the laws of history. And especially, from the practical point of view, he saw that no general theory fit to serve as a basis for the amelioration of society could be deduced from mere abstract reasonings about human nature, or obtained inductively from the mere observation of contemporary social phenomena. All theories formed in this way, without reference to the order of historic progression, are in danger of being stated too absolutely, and are wont to give birth only to utopian projects. Comte was never weary of pointing out the errors of those political economists who deduce general laws of accumulation and distribution from the industrial phenomena presented by a single country at a particular epoch; or of those moralists who base their theories upon that absurdest of aphorisms, that "human nature is always and everywhere the same"; or of those legislators who, in ignorance of the fact that humanity is travelling in a definite and partially ascertainable direction, fondly hope to amid the host of pregnant suggestions concerning Greek and Roman, and especially concerning mediæval, history, the great fact that there has been and is a determinate order of sequence in human affairs is placed quite beyond cavil on the highest plane of inductive demonstration.

To achieve so much as this was to show that a science of sociology is possible, and to prepare the way very thoroughly for the creation of such a science. But Comte professed to have done more than this. He regarded himself as the founder of sociology, and is so regarded by his disciples. It is part of our business to determine, if we can, whether the claim is a valid one; and in order to do this, we must examine the theorems which Comte propounded as the fundamental laws of progress.

These theorems are two in number,—the first relating to the intellectual, the second to what we may call the material, development of mankind. The first is an old acquaintance, being nothing else than the generalization that all human conceptions must pass through three stages—the theological, the metaphysical, and the positive. We have already (Part I. chapter vii.) examined this theory upon its own merits. Tried by a psychological analysis, we have found it to be only partially true. We saw it to be correct in so far as it asserts that the prevailing conception of the world becomes less and less anthropomorphic from age to age; but incorrect in so far that it asserts that in this deanthropomorphizing process there are three radically distinguishable stages, and also, in so far as it asserts that the process must end in Positivism. We saw that, although without doubt men began by seeing volition everywhere and must end by seeing an inscrutable Power everywhere, nevertheless the mental process has throughout been one and the same, and any appearance of definite stages can be only superficial. Nevertheless, between the primeval savage who prays to his fetish and the modern philosopher who recognizes that he must shape his conduct according to invariable laws or pay the penalty in some form of inevitable suffering, the difference in mental attitude is so vast that we may well have a distinction in terms to correspond to it. It is for this reason that I have frequently contrasted Anthropomorphism and Cosmism as the initial and final terms of a continuous progression. This, however, is not the Comtean doctrine. Again, metaphysics, as Comte understands it, being merely imperfect scientific inquiry conducted by the aid of the subjective method bequeathed by anthropomorphism, cannot be regarded as the peculiar possession of any particular stage.

But while Comte's theorem, in spite of these radical defects, contains a germ of truth and has been found to be eminently useful as a formula for intellectual development, I cannot but be surprised that Comte should have regarded it as the fundamental law of social progress, and still more that such able writers as Mr. Mill and Mr. Lewes should at the present day be found countenancing such an opinion. Does this "law" explain how it was that Greek civilization prematurely failed? Does it throw any light upon the causal connection between Roman universal dominion and the Christian sentiment of the brotherhood of men? Does it recognize the distinction between the growth of a community in size and its growth in structure, or hint to us that the differences between Chinese and European civilization may be summed up in the statement that China is only a stupendous tribal community, while Romanized Europe is virtually a federation of exceedingly heterogeneous national aggregates? And while, as we shall presently see, it unconsciously recognizes that intellectual development is a continous process of adaptation, does it say anything about that slow process of emotional change by which the more harmonious co-operation of societies and the more perfect freedom of individuals are alike rendered possible? Indeed it says nothing about any of these things; and I must think that these are very extensive lacunæ in a theorem which professes to be the fundamental law of social progress.

But this formula, as it stands, is not the whole of Comte's fundamental law of history. With the advance from theological, through metaphysical, to positive conceptions of the world, Comte couples an advance from military to industrial life, through an ill-defined intermediate stage—inserted, doubtless, to complete the threefold parallelism—which he calls the "legal" stage. Thoroughly to explain what he means by this "legal" stage of society, would require more detail than I can here well indulge in. We must be content with observing that he means to designate that epoch, which indeed we have not yet left behind us, in which parliamentary legislation is thought competent to renovate society artificially,—in which it is supposed that legislatures can make men rich by giving them paper-money, intellectual by patronizing literature, temperate by closing dram-shops. As this phase of opinion was very conspicuous in the eighteenth century, coupled with metaphysical systems of political ethics deduced from revolutionary theories of the "inherent rights of man," Comte links this whole set of doctrines together, and makes a so-called metaphysico-legal stage in social progress. But I cannot think this a happy generalization. This "legal" stage is, at the best, a phase of intellectual development, and to introduce it into the midst of a purely social progress from military to industrial life, seems too much like committing the logical fallacy known as cross-division. Omitting this stage, then, and reducing Comte's double formula to its lowest terms,—the only ones, I think, upon which he himself would invariably have insisted,—we have the following, as the Comtean law of progress:—

The progress of society is a gradual change from anthropomorphic to positive conceptions of the world, and from military to industrial modes of life; and the latter kind of change is determined by the former.

Such is the form of statement most favourable for Comte, and at the same time I believe it to be the one which best represents his permanent opinion. We shall presently see that the generalization of the change from military to industrial modes of life is one of great value, and it is to the thorough elaboration of it that much of the merit of Comte's social philosophy is due. But I must first call attention to the fatal defect in the above formula, the defect which destroys its claim to be regarded as the law of progress. That fatal defect is its total omission of moral feeling as a factor in social evolution. Though he is far from committing Mr. Buckle's absurdity of denying that there has been any improvement in moral feeling, Comte nevertheless falls into substantially the same error with Mr. Buckle, in attempting to explain all social progress as due simply to a progressive alteration of opinion. The error is one which seems to be shared by two other eminent writers,—Mr. Mill and Mr. Lewes. Here are the statements of the four: Mr. Mill says, "We are justified in concluding that the order of human progression in all respects will mainly depend on the order of progression in the intellectual convictions of mankind."[1] Mr. Lewes says, somewhat more vaguely, "The evolutions of Humanity correspond with the evolutions of Thought."[2] Mr. Buckle says, "The progress of mankind depends on the success with which the laws of phenomena are investigated, and on the extent to which a knowledge of those laws is diffused."[3] Comte says, "It is not to the readers of this work that I think it necessary to prove that ideas govern the world, and that the social mechanism reposes ultimately upon opinions."[4]

Now it is not so much because of what these propositions assert as because of what they omit, that they must be pronounced unsatisfactory and misleading. It is beyond question that the progress of mankind does depend upon the progressive conformity of the order of their conceptions to the order of phenomena; but, after the inquiry contained in the preceding chapter, I believe no further proof is necessary to convince us that the progress of mankind also depends upon the progressive conformity of their desires to the requirements arising from their aggregation in communities. If civilization is a process of intellectual adaptation, it is also a process of moral adaptation; and the latter I believe to be the more fundamental of the two. The case is well stated by Mr. Spencer, in the following passage: "Ideas do not govern the world; the world is governed by feelings, to which ideas serve only as guides. The social mechanism does not rest finally upon opinions; but almost wholly upon character. . . . . All social phenomena are produced by the totality of human emotions and beliefs: of which the emotions are mainly predetermined, while the beliefs are mainly post-determined. Men's desires are chiefly inherited; but their beliefs are chiefly acquired, and depend on surrounding conditions; and the most important surrounding conditions depend on the social state which the prevalent desires have produced. The social state at any time existing is the resultant of all the ambitions, self-interests, fears, reverences, indignations, sympathies, etc., of ancestral citizens and existing citizens. The ideas current in this social state must on the average be congruous with the feelings of citizens; and therefore, on the average, with the social state these feelings have produced. Ideas wholly foreign to this social state cannot be evolved, and, if introduced from without, cannot get accepted—or, if accepted, die out when the temporary phase of feeling which caused their acceptance ends." This statement, I may observe in passing, is well illustrated by the abortive attempts of missionaries to civilize the lower races of mankind by converting them to Christianity. Though they sometimes succeed in procuring temporary verbal acceptance for Christian ideas, they almost always fail in effecting a genesis of Christian feeling, and such civilization as they are able to produce is apt to be both superficial and transient. This is simply because civilization is not a mere process of external acquirement, but is a process of slow adaptation or breeding, which requires many generations to effect a permanent modification of character. The Fiji, whose language contains no words expressive of the higher emotions or the more exalted principles of action, cannot be made into a Christian. You may cover him with a very little of the external varnish of civilization; you may astonish him into accepting a few formulas, to him quite unintelligible, concerning the relations of man to his Creator; but, after all, he remains a savage still, in feelings and in habits of thought, bloodthirsty, treacherous and superstitious, with a keen appetite for human flesh. Or suppose you could resuscitate a mediæval baron—one of those innumerable freebooters who lived entrenched in the romantic castles of the Rhine and levied blackmail on every luckless wayfarer—suppose you could resuscitate such a man, and were to endeavour to expound to him in the simplest language a few of the most self-evident modern axioms concerning political rights and the interdependence of human interests: would he understand you? By no means. So vast would be the difference in mental habit, that in all probability he could not even argue with you. "Hence"—to continue with Mr. Spencer—"though advanced ideas when once established act upon society and aid its further advance; yet the establishment of such ideas depends on the fitness of the society for receiving them. Practically, the popular character and the [illegible] state determine what ideas shall be current; instead of [illegible] current ideas determining the social state and the character. The modification of men's moral natures, caused by [illegible] continuous discipline of social life, is therefore the chief proximate cause of social progress."

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[1] *System of Logic*, 4th edit., vol. ii. p. 517.
[2] *Philosophy of the Sciences*, p. 23.
[3] *History of Civilization*, vol. ii. p. 1.
[4] *Philosophie Positive*, tom. i. p. 48.

It is worthy of note that Comte, in his later period, comes partly around to this very point of view. At the beginning of the "Politique Positive," we find him announcing that the increasing tendency in the altruistic impulses to prevail over the egoistic impulses is the best measure by which to judge of the progress of society.[1] Yet the unsteadiness with which he grasped this principle is revealed by the somewhat misty statement, a few pages further on, that "the co-ordination of human nature as a whole depends ultimately upon the coordination of intellectual conceptions." A similar fluctuation in opinion may be noticed in Mr. Buckle; and it was indeed hardly possible for the function of moral feeling as a factor of progress to be thoroughly understood by writers unacquainted with the laws of adaptation upon which the scientific interpretation of that function is based. But whatever Comte's latest opinions may have been, since he never formulated any law to include the action of moral feeling as a factor of progress, his claims to be regarded as the founder of sociology must rest entirely upon his theory of progress as announced and elaborately illustrated in the "Philosophie Positive."

That theory, as we now see, is much too incomplete to serve as the foundation for a scientific study of history. Civilization cannot be summed up in the correct formula that men's occupations begin by being military and end by being industrial, or in the incorrect formula that men's conceptions of the world begin by being anthropomorphic and end by being positive; nor is it true that the former change is determined by the latter. We need to add the formula that men's feelings begin by being almost purely egoistic and must end by being altruistic to a considerably greater extent than will suffice to prevent individual interests from clashing

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[1] *Politique Positive*, tom. i. p. 16.

And even with all three formulas before us, we need something more before we can say that we have obtained the Law of Progress. These formulas are historical generalizations of great value; but as thus announced, they are too isolated with respect to each other. The progress of society is not moral progress, or intellectual progress, or material progress; but it is the combination of all the three. Our three formulas, therefore, must be integrated in a single formula. And this is done, and satisfactorily done, when it is shown that they are all involved in that law of adaptation or adjustment which underlies sociology, as well as psychology and biology.

That the progress from egoism to altruism is involved in that fundamental law, was proved in the preceding chapter, and has been illustrated throughout the whole of this discussion. But the law of adaptation equally involves the progress from Anthropomorphism, not to Positivism, but to Cosmism, as a necessary corollary. For what does that progress depend upon? What is the underlying process of which it is the necessary symptom and result? Why is it that men begin by investing the unknown causes of phenomena with quasi-human attributes and end by recognizing a single Cause which is inscrutable? In treating of deanthropomorphization (Part I. chap. vii.) we examined this point. We perceived the primitive anthropomorphism to be a corollary from the relativity of all knowledge. We saw that, to interpret phenomena at all, men must interpret them in terms of their own consciousness. We saw that before the dawn of science, when events seemed isolated and capricious, the phenomenon itself was by a natural inference—which only the progress of science has taught us to correct—endowed with a quasi-human personality. We traced the manner in which, as phen [illegible] generalized in wider and wider groups, the [illegible] nomena become conceived as more and m [illegible] become stripped by slow degrees of [illegible] vestments. Until finally, when generalization has proceeded to such an extent as to give us a single grand science of Cosmology, dealing with the Universe as an integral whole, there comes to be recognized a single Cause of phenomena, which, as being infinite, cannot be in any anthropomorphic sense personal, and which, as being absolute, must be inscrutable.

Thus we see that Comte's formula is not fundamental, even as a formula for intellectual development. The process of deanthropomorphization is not the fundamental fact. The continuous organization of knowledge and generalization of phenomena is the fundamental fact, of which the continuous deanthropomorphization is the necessary symptom and result. Now in Part I. chap. ii., we traced the outlines of this continuous organization of knowledge; and we found that the advance from incomplete to complete knowledge consists in the continuous establishment of groups of notions which are ever more coherent within themselves, while they are ever more clearly demarcated from one another. Now what is all this but a continuous process of differentiation and integration? When we say that from first to last, from the simplest cognitions of infancy to the widest generalizations of science, we cognize phenomena invariably through difference and likeness, we mean that we are continually differentiating notions answering to unlike phenomena and continually integrating notions answering to like phenomena. Or, to express the same thing in other words, we are continually establishing relations of likeness and unlikeness among our conceptions, that in some way or other definitely correspond to relations of likeness and unlikeness among phenomena. Thus our intellectual progress is at bottom a process of adaptation. And, when treating of the Test of Truth (Part I. chap. iii.), it was shown that Truth, the goal of intellectual progress, is nothing else than the complete adaptation of the order of conceptions to the order of phenomena,—the establishment of inner relations that are in equilibrium with outer relations. Thus we obtain a veritable law of intellectual progress; whereas to say that men's conceptions pass from Anthropomorphism to Positivism is merely to enunciate an empirical generalization, which, besides being empirical, is also radically imperfect.

The gradual change from a military to an industrial life must also seek its rational explanation in the law of progress as above formulated. The diminution of warfare and the concomitant increase of devotion to industrial pursuits are entailed by the growth of communities in size and structure. Among the primitive tribal societies there is no industrial life save that implied in hunting and fishing, and at a somewhat later date in the rearing of domestic animals. Settled agricultural pursuits require a greater power of continuous application and a more developed ability to subordinate present enjoyment to the anticipation of future needs than is to be found in the primitive savage. It is only the mental habit produced by long-continued social discipline which enables us to work to-day that we may enjoy the fruits of our labour at a distant period. The primeval tribe wanders from spot to spot, seeking ever a better hunting-ground or richer pasturage, leading a predatory life which differs in little save in its family organization from that led by the lower animals. In this stage of society constant warfare is inevitable, since each tribe must fight or be crushed out of existence by neighbouring tribes. Over a large part of the earth's surface, such has been the monotonous career of savage man from the earliest times until the present day. Such appears to have been, in its main features, the ancient history of our own country before its conquest by Europeans, as it is admirably delineated in the writings of that acute observer Mr. Parkman.

The exigencies of warfare, however, of themselves facilitate that integration of tribal communities which we have seen to be the indispensable condition of progress. A considerable step toward civilization is taken when tribes begin to aggregate for mutual defence over a wide tract of country. When America was discovered, an aggregation of this sort had apparently begun to be formed among the Iroquois; and such was the highest organization reached by the ancient Turanian tribes of Central Asia. A far more important step is taken when warfare ceases to be purely destructive and becomes acquisitive; or, in other words, when the victors, instead of massacreing the vanquished, begin to make slaves of them. By this step agricultural industry is fairly brought into existence, and the tribal confederacy becomes fixed in location and enabled to increase indefinitely in size at the expense of the less highly organized communities in the neighbourhood. Under these conditions the tribal confederacy may grow until it takes on the semblance of an "aggregate of the third order," as in China,[1] or in ancient Egypt, Assyria, Media, Lydia, and Persia. I am expressing something more than an analogy—I am describing a real homology as far as concerns the process of development—when I say that these communities simulated modern European nations much in the same way that a tree-fern of the carboniferous period simulated the exogenous trees of the present time. The vast growth and the considerable civilization obtained by such communities wererendered possible only through the institution of industrial slavery in place of the primeval indiscriminate slaughter of captives. Only through enforced labour did the continuous culture of the soil and the consequent stability of society become possible;

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[1] "In every respect the Chinese constitution of society may be regarded as a gigantic amplification of the constitution of the family. The family is no doubt the constituent element of which all societies are composed; just as, in the body, all tissues, nervous or muscular, are generated from the primitive cellular tissue; but whereas in other societies we find differentiation into classes and institutions which have no direct analogue in the family, in China we find far less of this, far more of adherence to the primitive social tissue, to the patriarchal type. On this type the village and the empire are alike moulded." Bridges, in *Essays on International Polity*, p. 401.

a point which Comte clearly saw, and has brilliantly illustrated.

Thus we see how the exigencies of self-protection entailed by the primitive state of universal warfare furnished of themselves the conditions for the rise of industry. We need not trace in detail the slow growth of the industrial spirit at the expense of the military spirit in the ancient civic communities, in the ancient and mediæval Empire, and in modern times. That has been done, with a masterly hand, by Comte. We may only note briefly how industry—the offspring of slavery, itself the offspring of warfare—has all along, by aiding the differentiation and integration of society, been draining the vitality out of its primeval parent. Let us note, then, that the kind of differentiation, known as "division of labour," by rendering the various portions of the community more and more dependent on each other, renders a state of warfare ever less easy to sustain, and therefore continually, though slowly, diminishes the frequency and shortens the continuance of wars. The statement that in early times a community is, on the whole, better able to endure protracted warfare than in later times, may be illustrated by a comparison between the Punic Wars of Rome and the War of Secession in our own country. The horrible destruction of life and property occasioned by the first and second Punic wars is minutely described in Mommsen's "Roman History." The first of these desperate struggles lasted twenty-three years, during the five severest of which the census of Roman patricians was diminished by one-sixth of the whole number,—a fact terrible to contemplate when its full significance is realized. After twenty-three years of comparative quiet began the still more deadly struggle against Hannibal, which lasted seventeen years. During this war, the total loss of life in all the communities engaged—Italian, Spanish, Sicilian, and A[illegible] [illegible] be estimated at less than 600,000 persons, [illegible] a loss which I believe somewhat exceeds that of the Northern and Southern States in the American war. But to make a fair comparison, we must include the circumstance that the population of these ancient communities was not more than one-sixth as great as the population of the United States; and that in ancient times the normal rate of increase of population was very much slower than in such a community as ours. The second Punic war was, therefore, relatively as murderous as our civil war would have been had it continued until between three and four million lives were destroyed. And if we would appreciate the direct damage to industry which it entailed, we have a sufficient datum in the fact that during those seventeen years more than four hundred flourishing towns and villages in Italy alone were blotted out of existence.[1]

Now opinions may differ as to the possibility of our carrying on for seventeen years a war which should drain our resources as the Hannibalic war drained the resources of Italy. Probably no country could so well sustain such a trial as the United States, owing to the favourableness of our social conditions for exceedingly rapid growth in wealth and population. Nevertheless, even omitting foreign interference from the account, I do not believe the thing would be possible. I believe it perfectly safe to assert that a war like the one we have lately passed through would, if prolonged to seventeen years, entail social disintegration throughout the community. Yet the absolute military power of the United States is incomparably greater than that of ancient Rome: wherein, then, lies the difference?

The explanation will be found, and the particular conclusion reinforced, when we consider the enormous increase of heterogeneity and interdependence in the modern as contrasted with the ancient community. In ancient Italy there was but little division of labour: it required but a few simple occupations to supply the wants of the whole community. In the United States considered as a whole, the division of labour is perhaps not quite so extreme as in western Europe, owing to the sparseness of population and the purely agricultural activity of large sections of the country: still, the industrial differentiation is very great, and to supply the wants of each portion of the community a vast number of mutually dependent and highly complicated occupations is indispensably necessary. Obviously the heterogeneous community cannot so well bear the abstraction of units from its mutually dependent parts, as the homogeneous community could bear the abstraction of units from its relatively independent and self-sufficing parts. The difference is much the same as the difference between cutting off portions of a worm and cutting off portions of a vertebrate animal. You may take one of the lower worms and slice away at it for some time without destroying it, but in the case of the vertebrate a comparatively small loss of parts entails destruction. In society the principle is the same. The Romans could lose army after army, while the few who remained at home could carry on all the agricultural and commercial operations necessary to the maintenance of the community. There were no great organized industries, manufacturing or commercial, so linked together that the destruction of any one might cause general financial disaster. But in any large modern community industry has become so heterogeneous that it is difficult for one part to take on the functions of another part, and so completely integrated that a sudden and considerable withdrawal of men from the ordinary pursuits of life can hardly take place without causing widespread suffering. And the contrast is made still greater by the industrial federation of modern communities as compared with the industrial isolation of ancient states. Though the time has perhaps [illegible] since Mediterranean civilization began, when a [illegible] continue very long in one community without tending to set up disturbance in some other, yet this interaction of different states was far less conspicuous in ancient than it is in modern times. The Hannibalic war might go on for seventeen years, and Athens or Alexandria not be much the worse off for it. But before the war of secession had continued twelve months, the consequent suffering in Lancashire was manifesting itself in riots, and England for a time seemed willing at all hazards to interfere and check the contest.

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[1] Mommsen, *Römische Geschichte*, tom. i. p. 671; see also p. 536.

This single example—out of hundreds that might be taken—must suffice to illustrate the way in which the ever-increasing interdependence of human interests, itself both the cause and the effect of industrial progress, is ever making warfare less and less endurable. To this it must be added that both moral and intellectual factors contribute to bring about the general result. As human interests in various parts of the world become more and more inextricably wrought together, and as communities which lie apart from each other come ever into closer contact, the ancient antagonisms of sentiment between them slowly disappear, and international friendship grows at the expense of the old hostility or distrust. Thus the moral adaptation due to long-continued social discipline diminishes the warlike feelings and strengthens the feelings which maintain an industrial *régime;* while on the other hand, intellectual adaptation, ever adding new complication to industry, arrays the opinion of society more and more decidedly against war, as against an intolerable source of disturbance. Besides which, the very heterogeneity of the military art, the increasing complication both of the implements and of the methods of warfare, due to scientific and industrial progress, renders war ever more costly, and makes the community less willing to engage in it. And these cooperating processes must go on until—probably at no very distant period—warfare shall have become extinct in all the civilized portions of the globe.

In so far as the present chapter has dealt with the claims of Comte to be regarded as the founder of sociology, I believe it is sufficiently proved that these claims cannot be sustained, though in many ways he did more than anyone else to prepare the way for such an achievement. If a man can ever be properly said to create or found a science, it is only when he discovers some fundamental principle which underlies the phenomena with which the science has to deal, and which thus serves to organize into a coherent deductive body of knowledge that which has hitherto been an incoherent empirical body of knowledge. It was in this way that Newton may be said to have created a science of celestial dynamics, and that Bichat is sometimes, and more loosely, said to have been the founder of modern biology. In no such sense can Comte be said to have created sociology. Standing at the vantage-ground of contemporary science which enables us to discern in outline the law of progress, we can see very well that Comte was far from detecting that law, and that, with the limited appliances at his command, he could not have been expected to discover it. Nevertheless his contributions to sociology were exceedingly brilliant and valuable, and he did perhaps all that the greatest thinker could have done forty years ago. He arrived at a [illegible] generalization of the phenomena of intellectual and material progress, as wide as could then be reached by [illegible] historical induction: and he verified this [illegible] generalization by an elaborate survey of ancient and [illegible] which, even had he written nothing else, would [illegible] to make his name immortal. [illegible] ranked first among those [illegible] solely on the historical [illegible] plane, perhaps, than Vico or Montesquieu [illegible] Condorcet. That generalization [illegible] far as it is correct, we have [illegible] the fundamental law of social [illegible] ceding chapter. We have seen that the continuous adaptation, both moral and intellectual, of the community to its environment, involves, as necessary concomitants, both the progressive deanthropomorphization of men's conceptions of Cause, and the gradual change from military to industrial habits of life. And the harmony between the results thus obtained by pursuing two wholly independent lines of inquiry, adds fresh support both to the fundamental law and to its historic corollaries. In the very act of proving that Comte did not achieve the whole, we do but place what he did achieve upon a deeper and firmer basis.

CHAPTER XX.

CONDITIONS OF PROGRESS.

AT the beginning of the chapter on the Evolution of Society we remarked upon the error of those metaphysical writers who have gone so far as to ascribe progressiveness to an occult tendency inherent in human nature. It need not take a very long survey of human societies, past and present, to assure us that beyond a certain point stagnation has been the rule and progress the exception. Over a large part of the earth's surface the slow progress painfully achieved during thousands of prehistoric ages has stopped short with the savage state, as exemplified by those African, Polynesian, and American tribes which can neither work out a civilization for themselves, nor appropriate the civilization of higher races with whom they are brought into contact. Half the human race, having surmounted savagery, have been arrested in an immobile type of civilization, as in China, in ancient Egypt, and in the East generally. It is only in the Aryan and some of the Semitic races, together with the Hungarians and other Finnic tribes subjected to Aryan influences, that we can find evidences of a persistent tendency to progress. And that there is no inherent race-tendency at work in these is shown by the fact that some of the Aryans, as the Hindus and Persians, are among the most unprogressive of men.

becomes apparent, therefore, that the progress of the European Aryans, and of such other races as have from time to time arisen from an immobile condition, can have been due only to a concurrence of favourable circumstances. In order to complete our outline-sketch of the Evolution of Society, we must consider some of these circumstances, and thus, so far as possible, redeem the promise which was implied at the beginning of the discussion. By pointing out some of the conditions essential to progress in civilization, we must endeavour to throw a glimmer of light upon the fact that so small a portion of the human race has attained to permanent progressiveness. A faint glimmer of enlightenment is indeed the most we can hope for, and even this will perhaps be thought to have been obtained by a mere restatement of the problem in other words. Nevertheless, in other departments of study as well as in algebra, much good is often done by reducing a problem from one form of expression to another. For if such a reduction ends in classifying the problem, the first and most important step is taken toward a solution. Let us deal in this way with the problem before us, which is one of the most complex and difficult that the history of the world presents.

It will be obvious to everyone that there is a close kinship between this question in sociology and the biological question why certain species remain unchanged through countless ages. The latter fact has been urged as an obstacle in the way of the development theory, and has been felt to be such by Dr. Bastian, who has endeavoured to dispose of it by an extraordinary application of his favourite theories of archebiosis and heterogenesis.[1] But indeed those who urge this fact as an obstacle, and those who seek to explain it away, show that they have not thoroughly comprehended the Doctrine of Evolution. For example, it is not implied in the general law of evolution, as above expounded in

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[1] Bastian, *Beginnings of Life*, vol. ii. pp. 584—640.

Chapter IV., that wherever the integration of matter and concomitant dissipation of motion are going on, there must always ensue a change from indefinite uniformity to definite multiformity of structure. As has already been shown, such a change can be expected to take place only when a number of specified circumstances concur in forwarding it. So it is one of the peculiar merits of Mr. Darwin's theory of natural selection, that it does not allege an unceasing or ubiquitous alteration of animal and vegetal forms, but includes, in a general way, all cases of persistence of type, as well as all cases of progress or retrogression. One and the same general theory accounts for the fact that, while some species thrive in the struggle for life and acquire new capacities, others dwindle in numbers or deteriorate in structure, while others again maintain themselves unchanged throughout immense periods. Throughout all these cases, the general truth is easily discerned that the total result will depend upon a very complex combination of circumstances: the difficulty is in applying the general truth to the special cases that arise. Probably no naturalist could point out all the specific circumstances which have caused any one race of animals to prevail over another in the struggle for life. Such a task would probably demand a more vast and minute knowledge of the details of the organic world than it is as yet possible for the most unremitting industry, inspired by the highest genius, to acquire. Yet no one doubts the general principle that it is natural selection which determines, not only which races shall prevail, but also which races shall vary and which shall remain unmodified. So in dealing with human societies, in the primitive era with which the present discussion is chiefly concerned, the historic data are insufficient to enable us to ascertain the precise circumstances to which the prevalence and the improvability of certain races are to be attributed. Nevertheless we can here, too, point out sundry general principles in accordance with which natural selection has determined the course of events.

In considering the action of natural selection upon the human race, we must first note how that action is, in some respects, materially modified by social conditions. Among inferior animals, even those which are gregarious, as the ruminants and sundry smaller carnivora, the preservation of any individual requires his almost complete adaptation to surrounding circumstances. There is so little division of labour, and consequently so little mutual assistance, that all must be capable who would survive. With the earliest manifestations of true sociality this state of things must be somewhat altered. Even in the rudest actual or imaginable society there is some division of labour, and some mutual assistance. Those who are less swift for hunting or less strong for fighting may at least perform services for the hunters and warriors, and in return will be more or less efficiently fed and protected; so that those who fall below the average capability of the race are no longer sure to be prematurely cut off, and thus the agency of natural selection in keeping up a nearly uniform standard of fitness is to some extent checked. In the highly complex societies which we call civilized, division of labour and cooperation have done much to obscure the effects of this agency. From the cooperation which goes on to a greater or less extent in all societies, and from the enormous heterogeneity of man's psychical organization, it follows that there are innumerable circumstances which may enable individual men to survive, in spite of their falling considerably short of the normal standard of the community and the age to which they belong. This fact, as will hereafter appear, renders it possible for man to have an ideal standard of excellence or successfulness in life, and is closely associated with the genesis of the ethical feelings of approval and disapproval.

But while natural selection among individuals grows somewhat less rigorous, its effects upon rival or antagonist societies are in nowise diminished in their beneficent severity. The attributes which tend to make a society strong and durable with reference to surrounding societies, are the attributes which natural selection will chiefly preserve. As Mr. Wallace has pointed out: "Capacity for acting in concert for protection, and for the acquisition of food and shelter; sympathy, which leads all in turn to assist each other; the sense of right, which checks depredations upon our fellows; . . . self-restraint in present appetites; and that intelligent foresight which prepares for the future, are all qualities that from their earliest appearance must have been for the benefit of each community, and would therefore have become the subjects of natural selection. Tribes in which such mental and moral qualities were predominant, would have an advantage in the struggle for existence over other tribes in which they were less developed, and would live and maintain their numbers, while the others would decrease and finally succumb."[1]

The most conspicuous result of this unceasing operation of natural selection upon rival communities, has been the continuous increase of the aggregate military strength of the human race, and the more and more complete segregation of this military strength into those portions of the race which are most civilized. As Mr. Bagehot has ably shown,[2] however broken or discontinuous the progressive career of the European family of nations may seem to have been in other respects, there can hardly be a doubt that the increase of their aggregate military force has been uninterrupted. There can hardly be a doubt that the total fighting power of the Mediterranean communities was greater under Trajan than in the time of Polybios; that the sum of Latin and Teutonic strength in the days of Charles Martel was greater than in the days of Marcus Aurelius; that the united Europe of Pope Gregory VII. could have vanquished the united Europe of Charles the Great, but would have been no match for the united Europe of Philip, Elizabeth, and Henry; or that the existing generation of Aryans in Europe and America represents a greater quantity of military power than any previous generation. This result is partly due to the mere increase of the civilized communities in size and industrial complexity, and partly to the integration, over wider and wider areas, of communities previously isolated. But while there have been periods of intermittence in the operation of these social and political circumstances, as during the Teutonic reconstruction of the Roman Empire, the increase in total fighting power appears to have gone on without intermittence, showing that it has been in great degree due to a cause unremitting in its operation. That cause has been natural selection. In the earlier and ruder times it has operated through the *actual* conquest of the weaker tribes, provinces, or cities, by the stronger. In later and more refined ages, the quieter but equally stringent competition of nation with nation, involving the *possible* conquest or relative humiliation of one by another, has caused a considerable proportion of the ever-accumulating intellectual and industrial acquirements of each nation to be expended (or, as Mr. Bagehot more happily says, " invested ") in an increase of military strength.

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[1] Wallace, *Natural Selection*, p. 312.

[2] See his *Physics and Politics*, London, 1872,—a little book so excellent both in thought and in expression that one cannot but wish there were much more of it.

From the cooperation of these circumstances the aggregate physical strength of civilized society has increased so enormously that in comparison with the military events of our time, the military events of antiquity seem like mere child's play, if we look at physical dimensions alone, and not at world-historic significance. Ignoring the latter point of view, Mr. Robert Lowe has maintained that the battle was an event of less importance than "a good colliery accident," because forsooth only 192 lives were lost on the side of the Greeks![1] To him, however, who has acquired the habit of looking at European history as one connected whole, it will not seem extravagant to say that contemporary English civilization is indebted to the victory of Marathon in a far higher degree than to the victories of Crecy or Agincourt, or even of Waterloo. The immense relative importance of some of these ancient military events of small dimensions, is due to the fact that military strength was not then concentrated in the most highly civilized communities, as it is in modern times. In antiquity there was a real danger that the nascent civilization of higher type might be extinguished by the long-established civilization of far lower type, or even by barbarism, through mere disparity of numbers. We do not know how often in prehistoric times some little gleam of civilization may have been put out by an overwhelming wave of barbarism, though by reason of the great military superiority which even a little civilization gives, such occurrences are likely to have been on the whole exceptional. This great superiority is well exemplified in the ease with which the Greeks defeated ten times their own number of Asiatics at Marathon, and afterwards at Kynaxa. Nevertheless it cannot be questioned that the invasions of B.C. 490 and 480 were fraught with serious danger to Grecian independence, and if Datis or Mardonios had happened to possess the military talent of Cyrus or of Timour, the danger would have been alarming indeed. Now if little Greece had thus been swallowed up by giant Persia, and the nascent political and intellectual freedom extinguished in Athens as it was in the Ionic cities of Asia Minor, the entire future history of Macedonia, of Rome, and of Europe, would have been altered in a way [illegible] pleasant to contemplate. When we reflect upon [illegible] place in human history which is filled by the products of Athenian intellectual activity during the two centuries succeeding the victory of Marathon; when we remember that the foundations of philosophy, of exact science, of æsthetic art in all its branches, of historic and literary criticism, and of free political discussion, were then and there for ever securely laid; when we consider the widely ramifying influences, now obvious and now more subtle, of all this intense productivity upon Roman ethics and jurisprudence, upon the genesis of Christianity, upon the lesser Renaissance of the thirteenth century, and the greater Renaissance of the fifteenth; when we see how inseparably the life of Athens runs as a woof through the entire web of European life down to our own times;—when we come to realize all this, we shall begin to realize how frightful was the danger from which we were rescued at Marathon and at Salamis.

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[1] [illegible] p. 498.

Probably at no subsequent time has European civilization been in a position of such imminent peril. In the life-and-death struggle between Rome and Carthage, the military superiority belonged so decidedly to the more highly-evolved community that even the unrivalled genius of Hannibal was powerless to turn the scale.[1] One of the most conspicuous features in Roman history, from the conquest of Spain by Scipio to the conquest of the Saxons by Charles the Great, was the continual taming of the brute force of barbarism, and the enlisting it on the side of civilization. In the earlier times there seems to have been real danger in the invasions of Brennus and of the Cimbri, and perhaps in that of Ariovistus. But with the conquest of Gaul and the more subtle process of Romanization which the Teutons underwent, the danger from these sources disappeared, until, when the great struggle with outer barbarism came in the fifth century, we see the Empire saved on a Gaulish field by the prowess of the West-Goth. The battle of Châlons seems to me to have been the last of the great fights in which the further continuance of European civilization was really imperilled. Though the victory of Attila could hardly have entailed the rebarbarizing of the whole Empire, it might well have caused such a temporary "solution of continuity" between ancient and modern history as the old historians supposed to have been wrought a few years later by the comparatively insignificant intrigues of Odoacer. Many hard-working years might have been needed to recover the ground thus lost. But in passing to the eighth century, I think we may well doubt the soundness of Gibbon's suggestion that the victory of Abderahman at Tours might have led to the Mohammedanization of Europe; for while one great defeat forced the Arab to retire behind the Pyrenees, on the other hand the complete overthrow of the Frankish power would probably have required many battles as fierce as this one. This increased toughness of civilization is still more plainly seen five centuries later, when the overwhelming victory of the Mongols at Liegnitz produced no effect at all beyond a temporary scare. It was not that the invasion under Batu was intrinsically less formidable than the invasion of Attila, but that the physical strength of civilized Europe had been growing throughout the long interval, so that the blow which might once have proved fatal was no longer dangerous. Since the fruitless sieges of Vienna by the Turks, the mere dread of barbaric or semi-barbaric invasion has passed away for ever. Tribally-organized barbarism is henceforth out of the lists entirely, and even the civilization of lower type has ceased to compete, in a military way, with the civilization of higher type.

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[1] See Arnold, *History of Rome*, vol. iii. p. 63.

Thus we see how natural selection, facilitating and cooperating with the integration of the more civilized communities and their increase in size and complexity, has gradually removed one of the dangers to which the earlier civilizations were exposed, and has concentrated the power of maki war on a grand scale into the hands of those communities in which predatory activity is at the minimum and industrial activity at the maximum. We are thus again reminded of the curiously cooperating processes, partially illustrated in the preceding chapter, through which warfare or destructive competition, once ubiquitous, is becoming evanescent, and giving place to a competition that is industrial or productive in character. But what now more especially concerns us is to look back to the earlier stages of the struggle for life between communities, and to observe some of the circumstances which must have tended to make some communities prevail over others.

The illustrations just cited show well enough the tendency of the higher type of civilization to prevail, in the long run, over the lower type. They are illustrations of the military advantages of civilization. And Mr. Bagehot has incidentally shown how thoroughly this fact disposes of the old-fashioned doctrine that modern savages are the degraded descendants of civilized ancestors. It was formerly assumed that, instead of mankind having arisen out of primeval savagery, modern savages have fallen from a primeval state of civilization, having lost the arts, the morality, and the intelligence which they once possessed; and of late years some such thesis as this has been overtly maintained by the Duke of Argyll. Such a falling off, upon any extensive scale, is in every way incompatible with the principle of natural selection. Take, for example, the ability to anticipate future contingencies—to abstain to-day that we may enjoy to-morrow. In the next chapter it will be shown that this is the most prominent symptom of the deepest of all the intellectual differences between civilization and savagery. Now, obviously, the ability to postpone present to future enjoyment is in a mere economic or military aspect such an important acquisition to any race or group of men, that when once acquired it would never be lost. The race possessing this capacity could by no possibility yield ground to the races lacking it, unless overwhelmed by sheer weight of vastly superior numbers,—a case which the hypothesis of a universal primitive civilization does not leave room for. Or take the ready belief in omens by which the life of the savage is so terribly hampered. Could a single tribe in old Australia have surmounted the necessity of searching for omens before undertaking any serious business, it would inevitably, says Mr. Bagehot, have subjugated all the other tribes on the continent. In like manner it is obvious that such implements as the bow and arrow and the iron swords or hatchets could never have given place to the boomerang and the knives and hatchets of stone or bronze; and the intellectual capacity implied in monotheism and the discovery of elementary geometry could never have been conquered out of existence by the intellectual capacity implied in fetishism and the inability to count above three or four. So, because the men who possess the attributes of civilization must necessarily prevail, in the long run, over the men who lack these attributes, it follows that there cannot have been, in prehistoric times, a general loss of the attributes, external and internal, of civilization.

Now one of the attributes which will most surely give to any group of men an advantage in the competition with neighbouring groups, is the presence of a powerful bond of union between its members. Our entire survey of social evolution shows that one of the most distinctive characteristics of civilized men is their capacity for acting in concert with one another over wider and wider areas. The next chapter will enable us more fully to understand that the acquirement of this capacity is simply a further prolonging of the extension of correspondences in time and space which has been shown to be a leading characteristic of psychical progress throughout the organic world. The growth of this capacity, during historic times, has been a complex result of the increase of progressive communities, in size, in heterogeneity, and in reciprocity of intercourse. For this many-sided development has not only entailed a relative weakening of the more anti-social impulses and a complicated interlacing of the interests of communities and individuals, but it has also entailed a general widening and diversifying of intellectual experiences, enabling men to realize the desirableness of those remoter ends which are indirectly secured by concerted action over wide areas. Thus in a high state of civilization a large amount of concerted action is ensured by the operation of the ordinary incentives to individual activity, without the aid of extraordinary incentives especially embodied in governmental edicts, political, sacerdotal, or ceremonial. But in a primitive state of society it is quite otherwise. It is notorious that uncivilized men cannot be made to act in concert save under the stimulus of loyalty to a chief, or of reverence for some superstition, or of slavish obedience to time-honoured custom. Hence in early times those communities are most likely to prevail, in which loyalty, reverence, and obedience are most strongly developed. From a military point of view there are hardly any other advantages which can outweigh these. Rigidity in family-relationships is one instance in which these advantages are manifested. A community in which the *patria potestas* is thoroughly established must inevitably subjugate those rival communities in which kinship is reckoned through females only. The common-sense of the old historians perceived and insisted upon the fact that much of the marvellous success of the Roman commonwealth was traceable to strictness of family-discipline. In like manner, as Mr. Bagehot has suggested, we may discern the true social function performed by those dreadful religions of early times which so naturally awakened loathing and horror in such thinkers as Lucretius: they enforced, with tremendous sanctions, such lines of conduct as were prescribed by the necessities of the primitive community; they rendered it easier to ensure concerted action among men by compelling all to act in conformity to some unchangeable rule.

In short, among numerous tribal groups of primitive men, those will prevail in the struggle for existence in which the lawless tendencies of individuals are most thoroughly subordinated by the yoke of tyrannical custom,—the only yoke which uncivilized men can be made to wear. Such communities will grow at the expense of tribes that are less law-abiding. It matters comparatively little, as Mr. Bagehot says, whether the tyrant custom be intrinsically good or bad: the great thing, at first, is to subject men's individualities to a system of common habits. Mr. Mill has complained, in his work on "Liberty" and elsewhere, that one of the characteristics of modern civilization is the disappearance of strongly-marked individualities, such as we find in mediæval and in ancient civilization. But surely he is quite mistaken in this,—and his mistake arises partly from neglect of the circumstance that in ancient and in feudal times the full manifestation of one powerful individuality was achieved only through the utter sinking of many weaker individualities, and partly from the fallacy of taking the unparalleled community of Athens as a type of ancient communities in general. Surely in no previous age has there been anything like so wide a scope for the manifestation of strongly-marked individuality of thought or character as in the present age. It would, indeed, be hardly too much to say that this is the first age in human history which has given us a realizing foretaste of the time when freedom of thought and freedom of action shall not only be acknowledged as a right but insisted upon as a duty for all men. But this is due to the fact that men's natures have, through long ages of social discipline, become in some degree adapted to the social state. This relatively free recognition of idiosyncrasies in thought or demeanour shows that modern society can count upon an organic or instinctive conformity to law on the part of individuals, upon which ancient society could not count. In early times, freedom from the yoke of custom meant simple lawlessness; and against such disintegrating lawlessness all the most formidable sanctions which society could devise were brought to bear. Hence the feeling of corporate responsibility is universal among primitive societies. "Not only the mutilators of the Hermai, but all the Athenians—not only the violator of the rites of the *Bona Dea*, but all the Romans—are liable to the curse engendered; and so all through ancient history." In such a stage of mental development, the community as a whole is beset with perpetual anxiety concerning the words and deeds of its members; and it is to a great extent from this sense of corporate responsibility that persecution for heresy in opinion or eccentricity in behaviour is ultimately derived.

The inference from all these considerations is obvious. Tribes with the strongest sense of corporate responsibility, with the most rigid family-relationships, the most despotic yoke of custom, go on growing through long ages at the expense of rival tribes in which the means for securing concerted action over wide areas are less perfect. Age after age some competing tribes are exterminated or enslaved, while others are absorbed by the victorious tribe and assimilated to it; and thus age after age the bond of tyrannical custom becomes stronger and more rigid, while it extends over wider areas and constrains a larger number of people to uniformity of behaviour. Such a process will naturally result in the formation of a huge social "aggregate of the first order," as in Egypt, Assyria, China, Mexico, and Peru. The common characteristic of these civilizations of lower type is that their growth in size has been out of all proportion to their increase in structural heterogeneity. Though they may contain many cities, they contain nothing like the civic type of social organization, as seen in Greece and Italy; and though they have taken on the semblance of nations, yet they lack the fundamental conception of true Nationality,—the union of individuals through community of interests, rather than through physical community of descent.[1] all these half-civilized societies, we find that the primi tribal or patriarchal mode of structure is simply e without being essentially altered. The family is unit of society, the sense of corporate responsibility is powerful, individual careers are still determined by s and not by contract, originality in opinion or in demeanour is still prohibited by the most formidable legal or so penalties; the tyranny of custom, in short, is still paramo and—to crown all—the three kinds of governmental ag political, ecclesiastical, and ceremonial, are still concentr in the person of the patriarchal ruler, who is at once king, chief-priest or vice-deity, and master of ceremonies.

Observe, now, the dilemma which seems to confront us. In the operation of natural selection upon primitive tribes, we seem to have found a satisfactory explanation of the growth of such social "aggregates of the first order" as China or old Mexico. But now, how are we going to get past this stage? How shall we account for the formation of social aggregates of a higher type? The problem now before us is how to relax the tyranny of custom, and thus afford a chance for social reorganization, without entailing a retrogression toward primeval lawlessness. It is one of the puzzles of sociology that the very state of things which is pre-eminently useful in bringing men out of savagery is also likely to be pre-eminently in the way of their attaining to a persistently progressive civilization. "No one," says Mr. Bagehot, "will ever comprehend the arrested civilizations unless he sees the strict dilemma of early society. Either men had no law at all, and lived in confused tribes, hardly hanging together, or they had to obtain a fixed law by processes of incredible difficulty. Those who surmounted that difficulty soon destroyed all those that lay in their way who did not. And then they themselves were caught in their own yoke. The customary discipline, which could only be imposed on any early men by terrible sanctions, continued with those sanctions, and killed out of the whole society the propensities to variation which are the principle of progress."[1]

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[1] In antiquity the only conceivable bond of social union was community of descent, actual or fictitious. Even the conception of territorial proximity as a source of common action did not gain currency in Europe till towards the tenth century of the Christian era. Theodoric the East-Goth, whom the old historians called "King of Italy," would not have understood the meaning of the phrase. In those days a man could be king of a group of kindred people, without reference to locality, but such a thing as kingship of a geographical area was unintelligible. The modern nationality (of which the United States is perhaps the most perfect type) is founded upon the thorough subordination of the patriarchal theory of community in blood to the modern theory of community in interests. The so-called "doctrine of nationalities," about which so much sentimental nonsense has been written, ought rather to be called the "doctrine of races," since it is virtually a revival of the patriarchal theory. It may be truly said that, in spite of greater ethnic diversity, Switzerland, for example, is in many respects more completely a nationality than Spain.

Mr. Bagehot shows that this problem has never been successfully solved except where a race, rendered organically law-abiding through some discipline of the foregoing kind, has been thrown into emulative conflict with other races similarly disciplined,—a condition which has been completely fulfilled only in the case of the migrating Aryans who settled Europe. But before we can extricate ourselves from our seeming dilemma, we need to point out, more distinctly than Mr. Bagehot has done, that in all probability none of the progressive Aryan races has ever passed through anything corresponding to the Chinese or Egyptian stage, and that when a community has once got into such a state of fixity, it is really questionable whether it can ever get out of it, unless under the direct tuition of other communities. It would at present be premature to speculate upon the results which are likely to flow from British dominion in Hindustan, or from the intrusion of European ideas into Japan and China. Looking to the past only, it is safe to say that when the "cake of custom" has become so firmly cemented, and on such a great scale, as in these primitively-organized communities, there is but little likelihood of its getting broken. The Oriental stage—if one may so call it—is not a stage through which progressive nations pass, but it is a stage in which further progress is impossible, save through the occurrence of some deep-reaching social revolution. The progressive races are just those which have in some way avoided this dilemma,—which have succeeded in securing concerted action among individuals without going so far as to kill out the tendency to individual variations. Historically we find no traces of primitive political despotism among the European Aryans. Alike among Greeks, Italians, Teutons, and Slaves, we find the elements of a free constitution at hand, and the "age of discussion" inaugurated, at the very beginnings of recorded history. Though society is still constructed on the patriarchal type, there is nevertheless an amount of relative mobility among the social units such as is not witnessed either in Oriental despotisms or among modern savages.

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[1] *Physics and Politics*, p. 57.

I believe, therefore, that the character of the dilemma is somewhat inadequately represented by Mr. Bagehot. It is not quite true that in a progressive society the "cake of custom" must first be cemented as firmly as possible, and then afterwards broken. For when the cementing passes beyond a certain point, the breaking becomes impracticable. The dilemma consists rather in the fact that in a progressive society the cementing and the breaking of the "cake of custom" must go on simultaneously. Observe the seeming contradiction.

While it is perfectly true that the power of concerted action on a large scale gives to the community possessing it a decided military advantage, and while it is true that in early times this power of cooperation can hardly be gained save through the uniformity of discipline prescribed by tyrannical custom, it is also true that a considerable amount of individual variability is even in early times a source of military strength to the community. For in all stages of progress the law holds good that in order to ensure a permanent supply of first-rate individual excellence, whether in intellect or in character, there must be perpetual variation,— the members of the community must not all conform to precisely the same standard of belief or action. It is not simply that out of the conflict of opinions there comes an increase of mental power, but it is that where absolute uniformity of opinion is enforced, the very individuals most capable of serving the community by reason of superior mental power are neglected, thwarted, or killed off. The truth is not yet wholly trite that the most valuable men of every age are its heretics. For this truth is obscured by the kindred truth that the heresy of one age is the orthodoxy of the next,— so that complacent orthodoxy, ignoring the historical point of view, is wont to claim as its allies to-day the very men whom it burnt or crucified in days gone by. Obviously it is in the nature of things that this should be so. If old-established ideas were never to be unsettled, new truths would cease to find recognition, and progress would be at an end. But in any age the discoverers and promulgators of new truths are to be found only among those who possess the superior mental flexibility requisite for shaking themselves loose from the network of old-established ideas. And wherever there is such mental flexibility, there is sure to be heresy. Above all is this true in early communities, for in these later times we have become so far accustomed to variations in belief and practice, and have so far substituted individual for corporate responsibility, that there is a great deal of variation which we do not count as heresy, but which formerly would have been regarded as such. Hence in an early community, the enforcement of absolute uniformity of belief and practice must establish a kind of natural selection tending to weed out all superior flexibility of mind. As a direct result the community closes up a prolific source of military superiority in the shape of individual political and military genius; for men of the Themistokles type are not produced, as a rule, in such states of society. The indirect result will be more fully appreciated when the next chapter has shown us how closely mental flexibility is implicated with that power of representing objects and relations remote from sense which also underlies the invaluable power of anticipating future emergencies. To weed out superior flexibility of mind is to check further development in forethought or longheadedness, —a truth of which the entire history of the Oriental communities, so unlike each other in many respects, is one long and reiterated confirmation. Still further, when we recall the patent fact that the efficiency of any community is measured by the efficiency of its individual members, and that this efficiency is kept up by a kind of natural selection which is none the less potent for not working with the death-penalty as among lower animals, we shall realize how great is the military advantage entailed by free variation and competition. In illustration of all this we may recur to a historical event already cited for other purposes. When the Mede, whose laws were quoted as the very type of unchangeableness, sought to add to his overgrown dominions the modest patrimony of the Athenian, of whom it was said that he was ever curious after new and unheard-of things, the wager of battle resulted in no doubtful verdict. When it is asked how Miltiades, with his ten thousand, could so quickly put to flight Datis, with his hundred thousand, the unhesitating reply is that the result was due to the superior social organization under which the ten thousand were reared. But this superiority of organization consisted mainly in the fact that the individual career of the Mede was prescribed by unvarying tradition, while the maxim upon which the Athenian implicitly acted was *La carrière ouverte aux talents.*

These are some of the military advantages of Mr. Bagehot's "age of discussion." But in truth they are advantages which do not belong exclusively to any age or to any epoch of development, but are operative at all times, though in different ages and communities their action is diversely complicated with the action of the opposite advantages previously considered. Mr. Bagehot's error—if it be real and not merely apparent—lies in describing as purely successive circumstances which must have been in great degree simultaneous. The "strict dilemma of early society" is not that the fetters of tyrannical custom must first be riveted and afterwards unriveted, but that they must be riveted and unriveted at the same time in communities which are destined to attain to permanent progressiveness. On the one hand we have seen that primitive societies in which uniformity of belief and practice is most sternly enforced, will prevail in the struggle for life. On the other hand we have seen that primitive societies in which flexibility of mind is most encouraged, will come out uppermost. And herein lies the seeming dilemma or contradiction.

In reality, however, as the whole question is one of warfare, so it is practically a struggle for life between these two principles. Into the numberless combinations of circumstances which have given the victory now to one side and now to the other, we cannot inquire, from lack of historical data. On general grounds we may admit that, at the outset, uniformity must have been a more important possession than flexibility; we can plainly see how those communities that conquered by means of uniformity became caught, as it were, in their own toils, and were estopped from further progression; and we can see how those communities that won the day by preserving a modicum of flexibility have been rewarded by unlimited progressiveness. We can thus dimly discern the way in which China has become immobile, while Europe has become ever more and more mobile. But beyond these most general indications of what has happened we can discern but little. We cannot tell precisely, for example, why the European began ever so far back by generating a modicum of flexibility rather than by [illegible] monotony of despotism [illegible] the earliest dawn of history the European [illegible] first catch sight of them. They were the pioneers or Yankees of prehistoric antiquity, in whom unusual flexibleness of mind was the natural result of continual change in the sets of relations to which they were obliged to make their theories and actions conform. Prehistoric antiquity presents no other case like this. The great immobile civilizations appear to have grown up in comparatively well-protected regions, where competition with outlying communities was checked at an early date. Screened in this way from intercourse with the outside world, and adapting themselves to an environment which altered but little, there was nothing which could serve to shake them loose from their monotony of discipline. A more extreme instance of a kindred phenomenon is seen in the fact that in those protected corners of the world where competition has always been at a minimum, we find the smallest conceivable amount of progress from utter bestial savagery. That same isolation which has kept the flora and fauna of Australia in such a backward state that they are now melting away before the imported plants and animals of Europe as snow melts under a vernal sun,—that same isolation has retained the Australian man until this day at the lowest level of humanity. Similar things might be said of the Fuegians, the Andaman Islanders, and some of the hill-tribes of aboriginal non-Aryan Hindus. Where there has been least competition and least natural selection, there has been least progress from savagery. Now returning to the immobile civilizations, when we bear in mind that of the two conflicting elements of military advantage, uniformity was likely to be of most importance at first and flexibility afterwards, we may begin to discern, I think, that where competition ceased at an early date, uniformity may well have carried the day and crushed out flexibility altogether. Herein we have an excellent explanation of the immobility of Egypt, China, Peru, and Mexico; and with some further qualifications an analogous case might be made out for Assyria and Northern India. But no such early cessation of competition could have occurred in the case of our Aryan forefathers. Little as we know concerning the circumstances of their prehistoric development, we know at least that it took place on the great highway between the teeming mainland of Asia and the coveted peninsula of Europe. In this swarming region there was kept up until quite recent times that intense competition of tribe with tribe which had all but died out in Egypt and China before the dawn of history. All this entailed for each winning tribe a greater heterogeneity of environment than in any other instance. Under such circumstances uniformity could hardly have carried the day so far as to crush out flexibility. Continual change of foes to be overcome, and of natural obstacles be surmounted, must have given the advantage at las those tribes which had gained enough uniformity to em concerted action, without sacrificing their versatility of mi in the process.

To some such considerations as these we must look the partial explanation of the fact that at the beginnings of recorded history we find in the European Aryans all the essential elements of progressiveness. The continuance of this progressiveness during the historic period is a fact which need not long detain us. Since the beginnings of Mediterranean civilization, the heterogeneity of the environment has been too great, and the changes in the environment too rapid, to allow of general stagnation; while the assaults of outer barbarism have been for the most part warded off by the military superiority which this higher civilization has entailed. At times there has been an appearance of danger that much of this hard-won advantage might be lost, not merely through assaults from without, but through causes internally operating. After the earlier incentives to noble and varied activity connected with the autonomous spirit had been destroyed by the universal hegemony of Rome, the need for protection from the threatening barbarian began to bring about a retrogression, in which for a time uniformity seemed likely to flourish at the expense of individuality. It is instructive, from this point of view, to observe the gradual change toward an Oriental type of government which went on from the time of Augustus to that of Diocletian. In the eastern half of the Empire, after its final political severance from the western half at the end of the eighth century, this change became really consummated, and after a while defeated itself by culminating in a social stagnation and military feebleness which invited the sharp scimitar of the Mussulman. But in the West this fatal growth of patriarchal despotism was early checked by the rise of Christianity as an independent spiritual power, by the immigration of the German tribes, and by the union of these two circumstances. Europe was in no immediate danger of lapsing into an Oriental condition when an Ambrose could say to a Theodosius, "Thus far shalt thou go and no farther." The German tribes, by their direct coalescence into national aggregates, without passing through the civic stage of organization, furnished, in various degrees of completeness, the principles of representation and federation, thus adding important elements of new life to the Empire. While finally the Christianization of these tribes, leading to the famous compact by which the Head of the Church transferred the lordship of the western world from the degenerate Byzantine to the strong-armed Frank, inaugurated a balance of powers which preserved Europe henceforth from any danger of becoming either a sultanate or a caliphate. In this twofold supremacy of Church and Empire during the Middle Ages, we have one of the most remarkable compromises between antagonist forces known to history; for while the tendency of either set of forces acting alone would have been toward absolute despotism, either in the spiritual or in the temporal form, on the other hand their joint action and counter-action was in a high degree conducive to the development of individual liberty of thought and behaviour.

The various hints here given thus combine to show how, both in historic and in prehistoric times, the European Aryans would seem to have profited by circumstances tending to encourage individuality without weakening concentration. Hence the peculiarly plastic consistency—the flexibility combined with toughness—of West-Aryan civilization. Hence the European races all possess the capacity of innovating without revolution. The English and the old Romans have exhibited this capacity in the highest degree; the Spaniards and the French, in recent times, owing to previous reversion toward a despotic *régime*, have shown themselves partially deprived of it. But while it is thus manifested in quite various degrees, all alike possess it in a high degree as compared with those races which have been arrested in the Oriental stage of civilization.

The successful achievement of innovation without revolution depends mainly upon an artifice which derives its validity from one of the most deep-seated tendencies of the human mind, and which has unquestionably been one of the chief agencies in forwarding social progress. I refer to the artifice of "legal fiction," as shown in the pretence that the novelty of belief or practice just inaugurated has its warrant in time-honoured precedent. The disposition to justify all innovation by means of this artifice is so strongly rooted in human nature that it is likely to be manifested for a long time to come,—probably until the millennial victory of that "pure reason" about which sentimental philosophers have prated, but which hitherto has played a very subordinate part in shaping human affairs. It is this disposition which leads the orthodox, after resisting some scientific heresy until resistance is no longer possible, to discover all at once that the heresy was really taught by Suarez, or St. Augustine, or Moses. It is this which enables changes to be made "constitutionally," or in accordance with a system of edicts framed in an age when the changes in question could not possibly have been contemplated or provided for. Yet among ourselves, where the dread of novelty is comparatively slight, there is some difficulty in realizing how all-essential is this kind of artifice in early times. "To this day many semi-civilized races have great difficulty in regarding any arrangement as binding and conclusive unless they can also manage to look at it as an inherited usage. Sir Henry Maine, in his last work, gives a most curious case. The English Government in India has in many cases made new and great works of irrigation, of which no ancient Indian Government ever thought; and it has generally left it to the native village community to say what share each man of the village should have in the water; and the village authorities have accordingly laid down a series of most minute rules about it. But the peculiarity is, that in no case do these rules 'purport to emanate from the personal authority of their author or authors, which rests on grounds of reason, not on grounds of innocence and sanctity; nor do they assume to be dictated by a sense of equity; there is always, I am assured, a sort of fiction under which some customs as to the distribution of water are supposed to have emanated from a remote antiquity, although, in fact, no such artificial supply had ever been so much as thought of.' So difficult does this ancient race—like, probably, in this respect so much of the ancient world—find it to imagine a rule which is obligatory, but not traditional."[1]

Now among the European Aryans, within historic times, this species of artifice assumed a form which made it in a very high degree conducive to the permanent progressiveness of the race. If we look into the great writers who in the seventeenth century illustrated with exquisite beauty and clearness the doctrines of Public Law, we find their heads filled with the notion of a primitive natural code, fit for regulating international concerns, and for supplying everywhere the shortcomings of civil legislation, its degenerate offspring, whose worth must be rated according to the degree in which it approaches the perfection of its parent. The influence of this conception may be best appreciated by reflecting on the extent to which contemporary legal literature, whether embodied in expository treatises or in judicial decisions, is impregnated by it. The appeals to "right reason" and "natural reason" which since Blackstone's time have filled a considerable place in juristic dissertation, bear unequivocal marks of their origin. Nowhere better than here can we see exemplified the mighty influence of the ideas of Roman jurisprudence upon modern thought. Sir Henry Maine has well delineated the process by which, from the constantly felt want of a system of principles fit for settling disputes between Roman citizens and aliens or foreigners, there gradually arose in the Prætorian courts an equitable body of law founded upon customs common (or assumed as common) to all peoples alike. But far from comprehending the really progressive character of the noble juristic system steadily growing up under their own supervision—daily attaining grander proportions as the grotesque and barbarous elements hallowed by local usage were one by one eliminated from the body of equitable ideas which formed their common substratum—the Prætors of the Republic and the great Antonine jurisconsults, under the immediate influence of Stoic conceptions, supposed themselves to be merely restoring to their original integrity the disfigured and partially obliterated ordinances of a primeval state of nature. The state of faultless morality and unimpeachable equity which constituted the ideal goal of their labours, they mistook for the shadow of a real though unseen past.

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[1] Bagehot, *Physics and Politics*, p. 142.

But this form of the unconscious artifice—due in general to the great heterogeneity of the Roman environment, and in particular to the continual interaction between Greek and

Roman ideas—was very different from the form of it exemplified by the Hindu who refers his modern edicts about water-supply to some remote era of primitive legislation. Between the two there is a world-wide difference,—all the difference between stagnation and progress. For the abstract and impersonal form in which the Roman conceived his *Jus Naturæ* made it possible for him to appeal to it, not simply in justification of particular departures from ancient custom, but in justification of the general principle of departure from ancient custom. It constituted, as it were, a court of appeal before which time-honoured customs must be called upon to establish their validity. It opened men's minds to the distinction between *mala prohibita* and *mala in se*. It prepared the way for the recognition of a "higher law" of God as distinct from the local and temporary laws of man. And in this way it no doubt contributed largely toward the establishment of Christianity as an independent spiritual power in the Empire.

To deal adequately with these interesting illustrations would require us to extend this part of our discussion to disproportionate length. Our purpose is sufficiently subserved by the foregoing fragmentary statement, in which the problem of human progressiveness, though not fully solved, is at least so far classified that the solution of it is facilitated. We have seen that permanent progressiveness is found where the social aggregate is characterized by a cohesion among its parts which is neither too little nor too great. An excess and a deficiency of individual mobility have been shown to be alike incompatible with that persistent tendency toward internal rearrangement which we call progressiveness. The sociological puzzle to which Mr. Bagehot has called attention, and with which we have been concerned in the present chapter, is substantially the same thing as the dynamic paradox which confronted us when, in the fourth chapter, we were seeking to determine the conditions which enable Evolution in general to result in continu of structural and functional complexity. The p se ca is, indeed, but a special form of the more g eral How to secure a compromise between fluidity and r in both cases the essential desideratum. Where the u which make up the aggregate have too much indi freedom of motion, the result is a fluid state in which is no chance for stable structural arrangements. Wher have too little freedom of motion, the result is a solid in which there is no chance for structural rearrangemen In the first case, where there is so little dissipation of motio there is little or no Evolution. In the second case, where little internal motion is retained, the Evolution which oc is simply or chiefly a process of consolidation, unattende any considerable advance from indeterminate unifor toward determinate multiformity.

Bearing in mind that we are dealing, not with a series of striking analogies, but with a group of real blances which result from a fundamental homology be the special process here considered and the more genera process which includes it, let us observe that one chief circumstance which secures mobility without loss of coherence is a heterogeneous and ever-changing social environment, to the heterogeneous changes of which the community is continually required to adjust itself. The illustrations above given unite in showing that where circumstances have afforded such a heterogeneous environment (as a perpetual external excitant of internal rearrangements), the communities which have survived through relatively-complete adjustment have manifested a permanent capacity for progress. Thus is our problem completely connected with the more general problem of natural selection, and with the most general problem of Evolution as manifested in all orders of phenomena. And thus the essential continuity of the processes of Nature is again strikingly illustrated.

In the following chapter we shall have frequent occasion to recur to this circumstance of heterogeneity of the social environment as manifested psychologically, in its effects upon the intellectual mobility of men regarded as individuals. To pursue the problem of progressiveness into this psychological region is the way in which to obtain a basis for the explanation of the progress from Brute to Man; and to this interesting inquiry we must now address ourselves.

CHAPTER XXI.

GENESIS OF MAN, INTELLECTUALLY.

THE chief difficulty which most persons find in accepting the Doctrine of Evolution as applied to the origin of the human race, is the difficulty of realizing in imagination the kinship between the higher and the lower forms of intelligence and emotion. And this difficulty is enhanced by a tendency of which our daily associations make it hard to rid ourselves. There is a tendency to exaggerate the contrasts which really exist, by leaving out of mind the intermediate phenomena and considering only the extremes. Many critics, both among those who are hostile to the development theory and among those who regard it with favour, habitually argue as if the intelligence and morality of the human race might be fairly represented by the intelligence and morality of a minority of highly organized and highly educated people in the most civilized communities. When speaking of mankind they are speaking of that which is represented to their imagination by the small number of upright, cultivated, and well-bred people with whom they are directly acquainted, and also to some extent by a few of those quite exceptional men and women who have left names recorded in history. Though other elements are admitted into the conception, these are nevertheless the ones which chiefly give to it its character. Employing then this conception of mankind, abstracted from these inadequate instances, our critics ask us how it is possible to imagine that a race possessed of such a godlike intellect, such a keen æsthetic sense, and such a lofty soul, should ever have descended from a race of mere brutes. And again they ask us how can a race endowed with such a capacity for progress be genetically akin to those lower races of which even the highest show no advance from one generation to another. Confronted thus by difficulties which reason and imagination seem alike incompetent to overcome, they too often either give up the problem as insoluble, or else—which amounts to nearly the same thing—have recourse to the *deus ex machinâ* as an aid in solving it.

Influenced, no doubt, by some such mental habit as this, Mr. St. George Mivart declares that, while thoroughly agreeing with Mr. Darwin as to man's zoological position, he nevertheless regards the difference between ape and mushroom as less important than the difference between ape and man, so soon as we take into the account "the totality of man's being."[1] In this emphatic statement there is a certain amount of truth, though Mr. Mivart is not justified in implying that it is a truth which the Darwinian is bound not to recognize. The enormous difference between civilized man and the highest of brute animals is by no one more emphatically recognized than by the evolutionist, who holds that to the process of organic development there has been superadded a stupendous process of social development, and who must therefore admit that with the beginning of human civilization there was opened a new chapter in the history of the universe, so far as we know it. From the human point of view we may contentedly grant that, for all practical purposes, the difference between an ape and a mushroom is of less consequence than the difference between an ape and an educated European of the nineteenth century. But to take this educated European as a typical sample of mankind, and to contrast him directly with chimpanzees is in the highest degree fallacious; since th proce involves the omission of a host of facts which, when into the account, must essentially modify the a ect whole case.

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[1] *Nature*, April 20, 1871.

When we take the refined and intellectual Teuton, one hundred and fourteen cubic inches of brain, alongside of the chimpanzee with his thirty-five of brain, the difference seems so enormous patible with any original kinship. But wh we in the Australian, whose brain, measuring seventy cubic comes considerably nearer to that of the chimpanzee to that of the Teuton, the case is entirely altered, an are no longer inclined to admit sweeping statements the immeasurable superiority of man, which we may admit, provided they are restricted to civilized m we examine the anatomical composition of these brai discovery that in structural complexity the Teutoni brum surpasses the Australian even more than the surpasses that of the chimpanzee, serves to strength in our position. And when we pass from facts of anatomy to facts of psychology, we obtain still further confirmation; for we find that the difference in structure is fully paralleled by the difference in functional manifestation. If the Englishman shows such wonderful command of relations of space, time, and number, as to be able to tell us that to an observer stationed at Greenwich on the 7th of June, A.D. 2004, at precisely nine minutes and fifty-six seconds after five o'clock in the morning, Venus will begin to cross the sun's disc; on the other hand, the Australian is able to count only up to five or six, and cannot tell us the number of fingers on his two hands, since so large a number as ten excites in him only an indefinite impression of plurality.[1] Our conception of the godlike intellect evidently will not apply here. If the emotions of the German and his intellectual perceptions of the fitness of harmonious sounds for expressing emotion are so deep and subtle and varied as to result in the production of choruses like those of Handel and symphonies like those of Beethoven, on the other hand the crude emotions of the Australian are quite adequately expressed by the discordant yells and howls which constitute the sole kind of music appreciable by his undeveloped ears. We look in vain here for traces of the keen æsthetic sense which in a measure links together our intellectual and moral natures. Again, if the American student has been known to be actuated by such noble ethical impulses and guided by such lofty conceptions of morality as to leave his comfortable home and his

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[1] The Dammaras, according to Mr. Galton, are even worse off than this. "When they wish to express four, they take to their fingers, which are to

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them as formidable instruments of calculation as a sliding rule is to an English school-boy. They puzzle very much after five, because no spare hand remains to grasp and secure the fingers that are required for units. Yet they seldom lose oxen: the way in which they discover the loss of one is not by the number of the herd being diminished, but by the absence of a face they know. When bartering is going on, each sheep must be paid for separately. Thus, suppose two sticks of tobacco to be the rate of exchange for one sheep, it would sorely puzzle a Dammara to take two sheep and give him four sticks. I have done so, and seen a man put two of the sticks apart, and take a sight over them at one of the sheep he was about to sell. Having satisfied himself that that one was honestly paid for, and finding to his surprise that exactly two sticks remained in hand to settle the account for the other sheep, he would be afflicted with doubts; the transaction seemed to come out too 'pat' to be correct, and he would refer back to the first couple of sticks; and then his mind got hazy and confused, and wandered from one sheep to the other, and he broke off the transaction until two sticks were put into his hand, and one sheep driven away, and then the other two sticks given him, and the second sheep driven away. . . . Once while I watched a Dammara floundering hopelessly in a calculation on one side of me, I observed Dinah, my spaniel, equally embarrassed on the other. She was overlooking half-a-dozen of her new-born puppies, which had been removed two or three times from her, and her anxiety was excessive, as she tried to find out if they were all present, or if any were still missing. She kept puzzling and running her eyes over them, backwards and forwards, but could not satisfy herself. She evidently had a vague notion of counting, but the figure was too large for her brain. Taking the two as they stood, dog and Dammara, the comparison reflected no great honour on the man."—Galton, *Tropical South Africa*, p. 132, cited in Lubbock, *Origin of Civilization*, Amer. ed., p. 294. See also Tylor, *Primitive Culture*, vol. i. pp. 218—246. Probably the dual number, in grammar, "preserves the memorial of that stage of thought when all beyond two was an idea of indefinite number." Id. p. 240.

favourite pursuits, and engage in rough warfare, at the risk of life and limb, solely or chiefly that he might assist in relieving the miseries of far inferior men, whose direct claim upon his personal sympathies could never be other than slight, on the other hand the Australian has no words in his language to express the ideas of justice and benevolence, and no amount of teaching can make him comprehend these ideas. For although, like some brute animals, he is not wholly destitute of the primary feelings which underlie them, yet these feelings have been so seldom repeated in his own experience, and that of his ancestors, that he is unable to generalize from them. The lofty soul, which is too sweepingly attributed to man in distinction from other animals, is here as difficult to discover as the godlike intellect or the keen æsthetic sense.

In similar wise is made to disappear the sharp contrast between human and brute animals in capability of progress. Hardly any fact is more imposing to the imagination than the fact that each generation of civilized men is perceptibly more enlightened than the preceding one, while each generation of brutes exactly resembles those which have come before it. But the contrast is obtained only by comparing the civilized European of to-day directly with the brute animals known to us through the short period of recorded human history. The capability of progress, however, is by no means shared alike by all races of men. Of the numerous races historically known to us, it has been manifested in a marked degree only by two,—the Aryan and Semitic. To a much less conspicuous extent it has been exhibited by the Chinese and Japanese, the Copts of Egypt, and a few of the highest American races. On the other hand, the small-brained races —the Australians and Papuans, the Hottentots, and the majority of tribes constituting the widespread Malay and American families—appear almost wholly incapable of progress, even under the guidance of higher races. The most that can be said for them is, that they are somewhat more imitative and somewhat more teachable than any brute animals. In the presence of the Aryan, even under the most favourable circumstances, they tend to become extinguished, rather than to appropriate the results of a civilization which there is no reason to suppose they could ever have originated. The two great races of Middle Africa, the Negroes and the Kaffirs,[1] have shown, by their ability to endure slave labour, their superiority to those above mentioned; but their career, where it has not been interfered with by white men, has been but little less monotonous than the career of a brute species. Of all these barbarian races, we commonly say that they have no history; and by this we mean that throughout long ages they have made no appreciable progress. In a similar sense we should say of a race of monkeys or elephants, that it has no history.

Of like import is the fact, that as we go backward in time we find the progressiveness of the civilized races continually diminishing. No previous century ever saw anything approaching to the increase in social complexity which has been wrought in America and Europe since 1789. In science and in the industrial arts the change has been greater than in the ten preceding centuries taken together. Contrast the seventeen centuries which it took to remodel the astronomy of Hipparchos with the forty years which it has taken to remodel the chemistry of Berzelius and the biology of Cuvier. Note how the law of gravitation was nearly a century in getting generally accepted by foreign astronomers,[2] while within half a dozen years from its promulgation the the of natural selection was accepted by the great majority naturalists. How small the difference between the clu waggons of the Tudor period and the mail-coach in w our grandfathers rode, compared to the difference bet the mail-coach and the railway train! How rapid changes in philosophic thinking since the time of the *clopédistes*, in comparison with the slow though imp changes which occurred between the epoch of Aristotle the epoch of Descartes! In morality, both individual national, and in general humanity of disposition and refinement of manners, the increased rapidity of change has bee no less marked.

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[1] It is Haeckel who asserts a distinction of race between the Negroes and Kaffirs. It is not necessary, however, to insist upon the distinction.

[2] It was still on trial in France in 1749, when Clairaut and Lalande magnificently verified it by calculating the retardation of Halley's comet. It may be said that the French are notoriously slow in adopting ideas which have originated in other countries, and that they now ignore natural selection much as they formerly ignored gravitation. Nevertheless, in spite of the Academy and M. Flourens, there are plain indications that the doctrine of special creations is doomed speedily to suffer the fate in France which it has already suffered in Germany, England, and America.

But these considerations are immensely increased in fo when we take into account those epochs which, in the of our present knowledge, can alone properly be ter ancient. Far beyond the comparatively recent peri which human history began on the eastern shores Mediterranean, extend the ages during which, as p tology shows us, both the eastern and the western hemispheres were peopled by races of men. Ten thousand centuries before the time of Homer and the Vedic poets, wild men, with brute-like crania, carried on the struggle for existence with mammoths, tigers, and gigantic bears, long since extinct. And recent researches make it probable that even this enormous period must be multiplied six- or eightfold before we can arrive at the time when men first appeared upon the earth as creatures zoologically distinct from apes. The significance of these conclusions, even when we take into account only the shorter epoch of a single million of years, cannot be too strongly insisted upon. They show us that it is only in recent times that man has become widely distinguished from other animals by his capability of progress. If, as evidence of our present progressiveness, we cite the superiority of our Whitworth guns and Chassepot rifles over the howitzers and flintlocks used by our grandfathers, we must also remember that more than twenty thousand generations lived and died before the primitive stone hatchets and stone-pointed arrows were superseded by battle-axes and javelins headed with bronze. During these long ages, each generation must have imitated its predecessor almost as closely as is the case with brute animals. The godlike intellect, of whose achievements we are now so justly proud, was then being acquired by almost infinitely minute increments. In the face of the proved fact of man's immense antiquity, no other conclusion is admissible.

I have introduced these considerations, not so much to confirm the theory of the descent of man from an ape-like animal,—which I regard as already sufficiently proved by the evidence presented in the ninth chapter,—as to illustrate the true point of view from which the evolution of humanity should be regarded. In treating of the Doctrine of Evolution in general, we saw it to be a corollary from the persistence of force that the process of evolution, which at first goes on with comparative slowness, must, owing to the multiplication of effects, go on with increasing rapidity.[1] We have seen, besides, that those most conspicuous aspects of evolution which consist in increase of definite complexity in structure and function must be much more conspicuous in the more compound than in the more simple kinds of evolution. In illustration of these closely allied truths, we may note that in all cases a long period of time elapses before any lower order of evolution gives rise to a distinctly higher order. Long ages must have passed before the slow integration of our solar nebula into a planetary system resulted in the appearance of distinctly geologic phenomena upon the several planets. Again, it was a long time before geologic evolution had proceeded sufficiently far to admit of the evolution of life: upon Saturn and Jupiter, as we have seen, the genesis of anything like what we know as life would appear still to be impossible. Again, after the first appearance of life upon our earth, a long time must have elapsed before protists, simple plants, and nerveless animals, were succeeded by animals sufficiently complex to manifest even the most rudimentary phases of psychical life. And again, as we can now see, the evolution of physical and psychical life to the very high degree exemplified in the primeval ape-like man, was followed by a somewhat long period, during which the still higher psychical changes constituting social evolution were slowly assuming their distinctive characteristics.

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[1] See above, vol. i. p. 354. This was also hinted at the close of the chapter on Life as Adjustment.

Social evolution, therefore, regarded as a complicat
series of intellectual and emotional changes determined
the aggregation of men into communities, is a new order
evolution, more highly compounded than any that had g
before it. When, in the course of the struggle for existe
men began to unite in family groups of comparatively permanent organization, a new era was begun in the progress of things upon the earth's surface. A new set of structural and functional changes began, which for a long while proceeding with the slowness characteristic of the early stages of every order of evolution, are at last proceeding with a rapidity only to be slackened when some penultimate stage of equilibrium is approached. Hence it is in the highest degree unphilosophical to attempt to explain the present position of civilized man solely by reference to the laws of organic and psychical evolution as obtained by the study of life in general. It is for biology to explain the differences between the human hand and foot and the hands and feet of the other primates;[1] but the chief differences between civilized man and the other members of the order to which

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[1] See Prof. Huxley's admirable monograph on *Man's Place in Nature*.

he belongs are psychological differences, and the immense series of psychical changes to which they are due has been all along determined by social conditions.

The all-important contrast, therefore—for our present purpose—*is not between man and other primates, extinct and contemporary, but between civilized man and primitive man.* Already we have found that the lowest contemporary man, whose social organization has never reached any higher form than that of the simplest tribal community, exhibits but scanty traces of the godlike intellect, the refined tastes, or the lofty soul which we are accustomed to ascribe to humanity in general as its distinctive attributes. Humanity, zoologically considered, exists to-day, to which these attributes cannot be ascribed without a considerable strain upon the accepted meanings of our words. Zoologically, the Australian belongs to the genus *Homo,* and is therefore nearer to us than to the gorilla or gibbon; psychologically, he is in many respects further removed from us than from these man-like apes. No one will deny that the intellectual progress implied in counting up to five or six, though equally important, is immeasurably inferior in quantity to the subsequent progress implied in the solution of dynamical problems by means of the integral calculus,—an achievement to which the average modern engineer is competent. But in going back to the primeval man, we must descend to a lower grade of intelligence than that which is occupied by the Australian. We must traverse the immensely long period during which the average human skull was enlarging from a capacity of thirty-five inches, like that of the highest apes, to a capacity of seventy inches, like those post-glacial European skulls, of which the one found at Neanderthal is a specimen, and which are about on a par with the skulls of Australians. And when we have reached the beginning of this period—possibly in the Miocene epoch—we may fairly represent to ourselves the individuals of the human genus as animals differing in little save a more marked sociality from the dryopithecus and other extinct half-human apes. We may represent primitive man as an animal in whom, physical and psychical changes having hitherto proceeded *pari passu*, intelligence had at length arrived at a point where variations in it would sooner be seized on by natural selection than variations in physical structure. When among primates possessed of such an intelligence, the family groups temporarily formed among all mammals began to become permanent, then we must say that there began the career of humanity as distinguished from animality. For countless ages our ancestors probably were still but slightly distinguished from other primates, save that their increasing intelligence, their use of weapons, and their habits of combination, rendered them more than a match much larger and stronger animals. In the later Pliocene tin these primitive men may have come to bear some rese blance to the lowest contemporary savages. Human rems and relics of the still later glacial period supply clear prooi such a resemblance; yet the absence of any improvement weapons and implements for many ages longer shows that as yet there was but little capability of progress. Of the career of mankind during the eight hundred thousand years which would seem to have elapsed since the era of the cave bear and woolly rhinoceros,[1] we possess many vestiges. But every-that, in point of intelligence and capacity for progress, the real contrast is not between all mankind and other primates, but between civilized and primeval man.

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[1] In assigning this conjectural date, I follow the theory which connects the great glacial epoch with that notable increase in the eccentricity of the earth's orbit which, as calculated by Mr. Croll, began about 950,000 years B.C., and lasted 200,000 years. But while the fact of this great increase of eccentricity is, I presume, well established, and while it can hardly fail to have wrought marked climatic changes, it is by no means proved that the glaciation of Europe and North America was produced solely or chiefly by this circumstance; and accordingly I do not care to insist upon the chronology which I have adopted in the text. Nor is it necessary for the validity of my argument that it should be insisted on. What we do know is, that men existed both in Europe and in North America at the beginning of the glacial period; that this extensive dispersal implies the existence of the human race for a long time previous to this epoch; and that thus we obtain a dumb antiquity in comparison with which the whole duration of the voice of historic tradition shrinks to a mere point of time. And this is all that my argument requires.

Let us now consider some of the leading characteristics of this gradual but increasingly rapid intellectual progress, regarded as a growing correspondence between the human mind and its environment.

In the second chapter of our Prolegomena it was shown that the highest kinds of scientific knowledge differ only in degree from the lowest kinds of what is called ordinary knowledge. In spite of their great differences in mental capacity, it is obvious that the antelope who on hearing a roar from the neighbouring thicket infers that it is high time to run for his life, the Bushman who on seeing the torn carcass of the antelope infers that a lion has recently b present, and the astronomer who on witnessing certain unforeseen irregularities in the motions of Uranus infers that an unknown planet is attracting it, perform one and all the sam kind of mental operation. In the three cases the process are fundamentally the same, though differing in complexity according to the number and remoteness of the past and present relations which are compared. In each case the process is at bottom a grouping of objects and of relations according to their likenesses and unlikenesses. It was similarly shown that all knowledge is a classification of experiences, and that every act of knowledge is an act of classification; that an act of *inference*, such as is involved in simple cases of perception, is "the attributing to a body, in consequence of some of its properties, all those properties by virtue of which it is referred to a particular class"; that the "forming of a *generalization* is the putting together in one class all those cases which present like relations"; and that "the drawing a *deduction* is essentially the perception that a particular case belongs to a certain class of cases previously generalized. So that, as ordinary classification is a grouping [illegible] reasoning is a grouping together of [illegible] things. In this fundamental doctrine [illegible] of modern psychology, represented [illegible] Mr Bain and Mr Mansel will thoroughly [illegible] it directly follows that the highest and [illegible] manifestations of intelligence consist respectively [illegible] in heterogeneity and definite- [illegible] which they are compounded.

[illegible] science is but an extension of or- [illegible] was next proved that the higher orders [illegible] from the lower in the greater remoteness, [illegible] of the relations which they for- [illegible] definiteness of their formulas, and in [illegible] organization. Our inquiry into the [illegible] intelligence[2] elicited an exactly [illegible] It was there shown that psychical [illegible] establishment of subjective rela- [illegible] relations, and that as we advance [illegible] from the lowest to the highest [illegible] between the mind and the environ- [illegible] which are continually more remote [illegible] but at the same time [illegible] traced a progressive orga- [illegible] correspondences. Continually, while passing in [illegible] aspects of the progress of intelligence [illegible] ourselves ending with [illegible] that progress of human intelligence [illegible] Let us now illus- [illegible] by tracing out the intellectual correspondence between man and his environment, as [illegible] in speciality and generality, in [illegible] definiteness, and in coherent organization.

[illegible] part ii.

[illegible]

The extension of the correspondence in space is a marked characteristic of intellectual progress, which we have already traced through the ascending groups of the animal kingdom, but which is carried much further by man than by any lower animal. It is no doubt true that the direct adjustments of psychical relations to distant objective relations, effected by unaided perception, have a narrower range in civilized men than in uncivilized men or in several of the higher mammals and birds. It is a familiar fact that the senses of civilized man—or at least the three senses which have a considerable range in space—are less acute and less extensive in range than those of the barbarian. It is said that a Bushman can see as far with the naked eye as a European can see with a field-glass ; and certain wild and domestic birds and mamm as the falcon, the vulture, and perhaps the greyhound, h still longer vision. Among the different classes of civili men, those who, by living on the fruits of brain-work d indoors, are most widely differentiated from primeval have as a general rule the shortest vision. And the r increase of indoor life, which is one of the marked symptoms of modern civilization, tends not only to make myopia more frequent, but also to diminish the average range of vision in persons who are not myopic. There may very likely have been a similar, though less conspicuous and less carefully observed, decrease in the range of hearing. And the sense of smell, which is so marvellously efficient in the majority of mammals and in many savages, is to us of little use as an aid in effecting correspondences in space.

In the case also of those simpler indirect adjustments which would seem, perhaps, to involve the use of the cerebellum chiefly, we have partially lost certain powers possessed by savages and lower animals. There are few things in which civilized men differ among themselves more conspicuously than the recollection of places, the identification of landmarks, and the ability to reach a distant point through crooked streets without losing the way. But in these respects the most sagacious of us are but bunglers compared with primitive men or with dogs and foxes. Few things are more striking than the unerring instinct with which the Indian makes his way through utterly trackless forests, seldom stopping to make up his mind, and taking in at a single glance whole groups of signs which to his civilized companion are inappreciable. The loss of this power of coordination, like the decrease in the range of the senses, is undoubtedly due to disuse, the circumstances of civilized life affording little or no occasion for the exercise of these faculties.[1]

But although in these respects the correspondence in space does not seem to have been extended with the progress of civilization, yet in those far more indirect and complicated adjustments which, as involving time-relations of force and cause, depend largely on the aid of the cerebrum, the civilized man surpasses the savage to a much greater extent than the savage surpasses the wolf or lion. "By combining his own perceptions with the perceptions of others as registered in maps," the modern "can reach special places lying thousands of miles away over the earth's surface. A ship, guided by compass and stars and chronometer, brings him from the antipodes information by which his purchases here are adapted to prices there. From the characters of exposed strata he infers the presence of coal below; and thereupon adjusts the sequences of his actions to coexistences a thousand feet beneath. Nor is the environment through which his correspondences reach limited to the surface and the substance of the earth. It stretches into the surrounding sphere of infinity." In all these respects, the extension of the correspondence achieved during the progress of civilization has been much greater than that achieved during the immediately preceding stages of the evolution of man from an inferior primate. "From early races acquainted only with neighbouring localities, up to modern geographers who specify the latitude and longitude of every place on the globe; from the ancient builders and metallurgists, knowing but surface deposits, up to the geologists of our day whose data in some cases enable them to describe the material existing at a depth never yet reached by the miner; from the savage barely able to say in how many days a full moon will return, up to the astronomer who ascertains the peri of revolution of a double star;—there has been" an enormous "widening of the surrounding region throughout which adjustment of inner to outer relations extends."[1] It remains to add that the later and more conspicuous sta this progress have been determined by that increase in the size and heterogeneity of the social environment which results from the growing interdependence of communities once isolated, and which we have already seen to be the fundamental element of progress in general. For this integration of communities has not only directly enlarged the area throughout which adjustments are required to be made, but it has indirectly aided the advances in scientific knowledge requisite for making the adjustments.

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[1] In the course of the recent interesting discussion and correspondence in *Nature* concerning the "sense of direction" exhibited in barbarians and lower animals, it was observed that a party of Samoyeds will travel in a direct line from one point to another over trackless fields of ice, even on cloudy nights, when there is accordingly nothing whatever that is visible to guide their course. It would be too much to assert that this faculty is utterly lost in civilized man, so that a temporary recurrence to the conditions of barbaric life might not revive it; but even if retained at all, it is certainly kept quite in abeyance.

Great, however, as has been the extension of the correspondence in space which has characterized the progress of the favoured portion of humanity from barbarism to civilization, the extension of the correspondence in time is a much more conspicuous and more distinctly human phenomenon. As we trace this kind of mental evolution through sundry classes and orders of the animal kingdom in an ascending series, it is to be observed that until we reach the higher mammals the two kinds of correspondence advance together, —the distance at which outer relations are cognized forming a measure of the interval by which their effects may be anticipated. But among the higher mammals there is observed a higher order of adjustments to future emergencies, which advances more rapidly than the extension of the correspondence in space, and which in the human race first acquires a notable development. "Not that the transition is sudden," observes Mr. Spencer. "During the first stages of human progress, the method of estimating epochs does not differ in nature from that employed by the more intelligent animals. There are historical traces of the fact that originally the civilized races adjusted their actions to the longer sequences in the environment just as Australians and Bushmen do now, by observing their coincidence with the migrations of birds, the floodings of rivers, the flowerings of plants. And it is obvious that the savages who, after the ripening of a certain berry, travel to the sea-shore, knowing that they will then find a particular shell-fish in season, are guided by much the same process as the dog who, on seeing the cloth laid for dinner, goes to the window to watch for his master. But when these phenomena of the seasons are observed to coincide with recurring phenomena in the heavens,—when, as was the case with the aboriginal Hottentots, periods come to be measured partly by astronomical and partly by terrestrial changes,—then we see making its appearance a means whereby the correspondence in time may be indefinitely extended. The sun's daily movements and the monthly phas[illegible] having once been generalized, and some s[illegible] having been reached, it becomes p[illegible] between antecedents and c[illegible] and to adjust the actions to in the environment which, in the absence of answering functional periods, cannot be directly responded to by the organism, may be discerned and indirectly responded to when there arises this ability of numbering days and lunations."[1]

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[1] Spencer, *Principles of Psychology*, vol. i. pp. 317, 319.

In the advance to high stages of civilization, the extension of the correspondence in time is most conspicuously exemplified in the habitual adjustment of our theories and actions to sequences more or less remote in the future. In no other respect is civilized man more strikingly distinguished from the barbarian than in his power to adapt his conduct to future events, whether contingent or certain to occur. The ability to forego present enjoyment in order to avoid the risk of future disaster is what we call prudence or providence; and the barbarian is above all things imprudent and improvident. Doubtless the superior prudence of the civilized man is due in great part to his superior power of self-restraint; so that this class of phenomena may be regarded as illustrating one of the phases of moral progress. Nevertheless there are several purely intellectual elements which enter as important factors into the case. The power of economizing in harvest-time or in youth, in order to retain something upon which to live comfortably in winter or in old age, is obviously dependent upon the vividness with which distant sets of circumstances can be pictured in the imagination. The direction of the volitions involved in the power of self-restraint must be to a great extent determined by the comparative vividness with which the distant circumstances and the present circumstances are mentally realized. And the power of distinctly imagining objective relations not present to sense is probably the most fundamental of the many intellectual differences between the civilized man and the barbarian, since it underlies both the class of phenomena which we are now considering, and the class of phenomena comprised in artistic, scientific, and philosophic progress. The savage, with his small and undeveloped cerebrum, plays all summer, like the grasshopper in the fable, eating and wasting whatever he can get; for although he knows that the dreaded winter is coming, during which he must starve and shiver, he is nevertheless unable to realize these distant feelings with sufficient force to determine his volition in the presence of his actual feeling of repugnance to toil. But the civilized man, with his large and complex cerebrum, has so keen a sense of remote contingencies that he willingly submits to long years of drudgery, in order to avoid poverty in old age, pays out each year a portion of his hard-earned money to provide for losses by fire which may never occur, builds houses and accumulates fortunes for posterity to enjoy, and now and then enacts laws to forestall possible disturbances or usurpations a century hence. Again, the progress of scientific knowledge, familiarising civilized man with the idea of an inexorable regularity of sequence among events, greatly assists him in the adjustment of his actions to far-distant emergencies. He who ascribes certain kinds of suffering to antecedent neglect of natural laws is more likely to shape his conduct so as to avoid a recurrence of the infliction, than he who attributes the same kinds of suffering to the wrath of an offended quasi-human Deity, and fondly hopes, by ceremonial propitiation of the Deity, to escape in future.

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[1] Spencer, op. cit. i. 326.

This power of shaping actions so as to meet future contingencies has been justly recognized by political economists as an indispensable prerequisite to the accumulation of wealth in any community, without which no considerable degree of progress can be attained. The impossibility of getting barbarians to work, save under the stimulus of actually present necessities, has been one of the chief obstacles in the way of missionaries who have attempted to civilize tribal communities. The Jesuits in the seventeenth century, were the most successful of Christian missionaries, and their proceedings with the Indians of Paraguay constitute one of the most brilliant feats in missionary annals. Such para ascendency did the priests acquire over the imagina of these barbarians that they actually made the from warfare. They taught them European me agriculture, as well as the arts of house-building, p dyeing, furniture-making, even the use of watches ; a administered the affairs of the community with a power which has seldom been equalled either in ab or in beneficence. Nevertheless the superficiality o show of civilization was illustrated by the fact that, un perpetually watched, the workmen would go home leaving their oxen yoked to the plough, or would even cut them u for supper if no other meat happened to be at ha Examples of a state of things intermediate between barbaric improvidence and the care-taking foresight o European are to be found among the Chinese,—a peo who have risen far above barbarism, but whose civilizati is still of a primitive type. The illustration is ren peculiarly forcible by the fact that the Chinese are a industrious people, and where the returns for labour are immediate will work as steadily as Germans or Americans. Owing to their crowded population, every rood of ground is needed for cultivation, and upon their great rivers the traveller continually meets with little floating farms constructed upon rafts and held in place by anchors. Yet side by side with these elaborate but fragile structures are to be seen acres of swamp-land which only need a few years of careful draining to become permanently fit for tillage. So incapable are the Chinese of adapting their actions to sequences at all remote, that they continue, age after age, to resort to such temporary devices, rather than to bestow their labour where its fruits, however enduring, cannot be enjoyed from the outset.[1] The contrast proves that the cause is the intellectual inability to realize vividly a group of future conditions, involving benefits not immediately to be felt.

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[1] See Mill, *Political Economy*, book i. chap. xi.

Of the correspondence in time, even more forcibly than of the correspondence in space, it may be said that its extension during the process of social evolution has been much greater than during the organic evolution of the human race from some ancestral primate. Between the Australian, on the one hand, who cannot estimate the length of a month, or provide even for certain disaster which does not stare him in the face, and whose theory of things is adapted only to events which occur during his own lifetime; and, on the other hand, the European, with his practical foresight, his elaborate scientific previsions, and his systems of philosophy, which embrace alike the earliest traceable cosmical changes and the latest results of civilization; the intellectual gulf is certainly far wider than that which divides the Australian from the fox who hides the bird which he has killed, in order to return when hungry to eat it.

It remains to add that the later and more conspicuous stages of this kind of intellectual progress have obviously been determined by the increase in the size and heterogeneity of the social environment. For the integration of communities to which this increase is due has not only indirectly aided the advances in scientific knowledge requisite for making mental adjustments to long sequences, past and future, but it has also directly assisted the disposition to work patiently in anticipation of future returns, by increasing the general security and diminishing the chances that the returns to labour may be lost.

The extension of the correspondence between subjective and objective relations in time and in space answers to that kind of primary integration which underlies the process of evolution in general. In treating of the enlarged area, in time and space, throughout which inner relations are adjusted to outer relations, we have been treating of intellectual progress regarded as a growth. But in proceeding to speak of the increasing heterogeneity, definiteness, and coherence of the adjustments, we proceed to treat of intellectual progress regarded as a development. Here, as elsewhere, throughout all save the simplest orders of evolution, quantitative increase is accompanied by qualitative increase. The knowledge is not only greater and the intellectual capacity greater, but the knowledge is more complex, accurate, and unified, and the intellectual capacity is more varied.

The increase of the correspondence in definiteness may be sufficiently illustrated by the following brief citation from Mr. Spencer: "Manifestly the reduction of objective phenomena to definite measures gives to those subjective action that correspond with them a degree of precision, a speci fitness, greatly beyond that possessed by ordinary actio There is an immense contrast in this respect between doings of the astronomer who, on a certain day, hour minute, adjusts his instrument to watch an eclipse, and of the farmer who so arranges his work that he may hands enough for reaping some time in August or September. The chemist who calculates how many pounds of quicklime will be required to decompose and precipitate all the bicarbonate of lime which the water in a given reservoir contains in a certain percentage, exhibits an adjustment of inner to outer relations incomparably more specific than does the laundress who softens a tubful of hard water by a handful of soda. In their adaptations to external coexistences and sequences, there is a wide difference between the proceedings of ancient besiegers, whose battering-rams were indeterminate in their actions, and those of modern artillery officers, who, by means of a specific quantity of powder, consisting of specific ingredients, in specific proportions, placed in a tube at a specific inclination, send a bomb of specific weight on to a specific object, and cause it to explode at a specific moment."[1] It only remains to note that the difference in specific accuracy, here illustrated by contrasting the operations of science with those of ordinary knowledge, is equally conspicuous when, on a somewhat wider scale, we contrast the proceedings, both scientific and artistic, of civilized men with the proceedings of the lowest savages. The most ignorant man in New England probably knows in June that winter is just six months distant; the Australian, to whom, as to the civilized child, time appears to go slowly, knows only that it is a long way off. So, too, the crude knives and hammers and the uncouth pottery of primeval man are distinguished alike by their indefiniteness of contour, and by their uselessness in operations which require specific accuracy. And here, as before, in the extreme vagueness and lack of speciality, both in his knowledge and in the actions which are guided by it, the primeval man appears to stand nearer to the highest brutes than to the civilized moderns.

Along with this increase in specialization, entailing greater definiteness of adjustment, there goes on an increase in generalization, involving an increased power of abstraction, of which barely the germs are to be found either in the lowest men or in other highly organized mammals. The inability of savage races to make generalizations involving any abstraction is sufficiently proved by the absence or extreme paucity of abstract expressions in their languages. As Mr. Farrar observes, "The Society-Islanders have words for dog's tail, bird's tail, and sheep's tail, yet no word for tail; the Mohicans have verbs for every kind of cutting, and yet no verb 'to cut.' The Australians have no generic term for fish, bird, or tree. The Malays have no term for tree or herb, yet they have words for fibre, root, tree-crown, stalk, stock, trunk, twig, and shoot. Some American tongues have separate verbs for 'I wish to eat meat,' and 'I wish to eat soup,' but no verb for 'I wish'; and separate words for a blow with a sharp and a blow with a blunt instrument, but no abstract word for blow."[1] Between the stage of intellectual progress thus illustrated and that in which an unlimited capacity for generalization produces such words as "individuation" or "equilibration," the contrast is sufficiently obvious; and it fully confirms our theorem, that the amount of intellectual progress achieved since man became human far exceeds that which was needed to transfer him from apehood to manhood.

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[1] Spencer, op. cit. i. 346

The increase of the correspondence in complexity, already illustrated incidentally in the treatment of these other aspects of the case, is still further exemplified in the growing complication of the interdependence between science and the arts. When tracing the complexity of correspondence through the lower stages of the evolution of intelligenc the animal kingdom, Mr. Spencer hints that the evolutio the executive faculties displayed in the organs of prehen and locomotion is closely related to that of the dire faculties displayed in the cephalic ganglia and in the of sense. The parallelism may be summed up in the ment that in most, if not all, the principal classes of animal kingdom, the animals with the most perfect prehensile organs are the most intelligent. Thus the cuttle-fish is the most intelligent of mollusks, and the crab similarly stands at the head of crustaceans, while the parrot outranks all other birds alike in sagacity and in power of handling things, and the ape and elephant are, with the exception of man, the most sagacious of mammals.[1] Of the human race, too, it may be said that, although Anaxagoras was wrong in asserting that brutes would have been men had they had hands, he might safely have asserted that without hands men could never have become human. Now this interdependence of the directive and executive faculties is continued throughout the process of social evolution in the shape of the interdependence of the sciences and the arts. "We may properly say that, in its higher forms, the correspondence between the organism and its environment is effected by means of supplementary senses and supplementary limbs. . . . The magnifying-glass adds but another lens to the lenses existing in the eye. The crow-bar is but one more lever attached to the series of levers forming the arm and hand. And the relationship, which is so obvious in these first steps, holds throughout." We may, indeed, go still deeper, and say that science is but an extension of our ordinary sense-perceptions by the aid of reasoning, while art is but an extension of the ordinary function of our muscular system, of expressing our psychical states by means of motion. Hence it is that "each great step towards a knowledge of laws has facilitated men's operations on things: while each more successful operation on things has, by its results, facilitated the discovery of further laws." Hence the sciences and arts, originating together,—as in the cases of "astronomy and agriculture, geometry and the laying out of buildings, mechanics and the weighing of commodities,"—have all along reacted upon each other, in an increasing variety of ways. It is sufficient to mention the reciprocal connections between navigation and astronomy, between geology and mining, between chemistry and all the arts; while telescopes and microscopes illustrate the truth that "there is scarcely an observation now made in science, but what involves the use of instruments supplied by the arts; while there is scarcely an art-process but what involves some of the previsions of science." Just as in organic evolution we find the mutual dependence of the directive and executive faculties ever increasing, so that "complete visual and tactual perceptions are impossible without complex muscular adjustments, while elaborate actions require the constant overseeing of the senses"; so in social evolution we find between science and art an increasing reciprocity "such that each further cognition implies elaborate operative aid, and each new operation implies sundry elaborate cognitions." I need only add that, in this as in the other aspects of intellectual progress, the increase in complexity of adjustment achieved during the process of social evolution is far greater than that achieved during the immediately preceding stages of the process of organic evolution. Between the ape and the primitive man, with his rude levers and hatchets and his few simple previsions, the difference in complexity of correspondence is obviously less than between the primitive man and the modern, with his steam-hammers and thermo-electric multipliers, and his long list of sciences and sub-sciences, any one of which it would take much more than a lifetime to master in detail.

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[1] *Chapters on Language*, p. 199.

[2] Spencer, op. cit. i. 368—372.

We have thus passed in review the various aspects of intellectual progress, regarded as a process of adjustment inner to outer relations, and we have seen that in all most essential features of this progress there is a wider ference between the civilized man and the lowest savage between the savage and the ape. It appears that thos and admirable qualities upon which we felicitate ourselves marks which absolutely distinguish us from brute animals, have been slowly acquired through long ages of social evolution, and are shared only to a quite insignificant extent by the lowest contemporary races of humanity. As long as we regard things statically, as for ever fixed, we may well imagine an impassable gulf between ourselves and all other forms of organic existence. But as soon as we regard things dynamically, as for ever changing, we are taught that the gulf has been for the most part established during an epoch at the very beginning of which we were zoologically the same that we now are.

The next step in our argument will be facilitated by an inquiry into the common characteristic of the various intellectual differences between the civilized and the primitive man which we have above enumerated. The nature of this [illegible] when we were discussing the [illegible] It was observed that the [illegible] relations not present [illegible] of the many intellectual [illegible] man and the barbarian. [illegible] wider, we may now safely [illegible] superiority of the civilized [illegible] modern man over the primeval [illegible] superior power of *representing* that [illegible] senses. For it is not only in what [illegible] superiority of representation [illegible] combinations of present [illegible] accompany the extension of the [illegible] time and its increase in hetero- [illegible] It is his ability to re- [illegible] states of consciousness, [illegible] that enables the civilized man to [illegible] occurring at the antipodes. [illegible] representation which underlies his [illegible] general conceptions. For the [illegible] conceptions is that "the matter of [illegible] any one action, but a [illegible] therefore, only when a [illegible] relations possessing some [illegible] represented in consciousness that there [illegible] which results in the abstraction [illegible] as the object of thought. Obviously, then, the greater the power of abstraction and generalization which is observed, the greater is the power of representation which is implied. The case is the same with that definiteness of the intellectual processes which we have noted as distinguishing modern from primitive thinking. For the conception which underlies definiteness of thinking is the conception of [illegible]—a highly abstract conception which can only be framed after the comparison of

numerous represented cases in which degree o ness is
the common trait that is thought about. Hence not o
the improvidence of the savage, but likewise the vague
of his conceptions, his inability to form generalizations
volving abstraction, and the limited area covered by
adjustments, are facts which one and all find their ultim
explanation in his relative incapacity for calling up r
sentative states of consciousness.

From this same incapacity results that inflexibilit
thought in which the savage resembles the brute, and
is one of the chief proximate causes of his unprogressive-
ness. "One of the greatest pains to human nature," sa
Mr. Bagehot, "is the pain of a new idea." This pain,
only to a few of the most highly cultivated minds in
most highly civilized communities has ceased to be a
and become a pleasure, is to the savage not so much a
a numbing or paralyzing shock. To rear elem
his beliefs is for the uncivilized man a
task. It is not so much that he
traditional association of ideas which he in
hood, as it is that he is incapable of holding together in thought the clusters of representations with the continuity of which the given association is incompatible. This important point is so ably and succinctly stated by Mr. Spencer, that I cannot do better than to quote his exposition entire. After reminding us that "mental evolution, both intellectual and emotional, may be measured by the degree of remoteness from primitive reflex action," Mr. Spencer observes that "in reflex action, which is the action of nervous structures that effect few, simple, and often-repeated coordinations, the sequent nervous state follows irresistibly the antecedent nervous state; and does this not only for the reason that the discharge follows a perfectly permeable channel, but also for the reason that no alternative channel exists. From this stage, in which the psychical life is automatically restrained

within the narrowest limits, up through higher stages in which increasing nervous complexities give increasing varieties of actions and possibilities of new combinations, the process continues the same; and it continues the same as we advance from the savage to the civilized man. For where the life furnishes relatively few and little-varied experiences, where the restricted sphere in which it is passed yields no sign of the multitudinous combinations of phenomena that occur elsewhere, the thought follows irresistibly one or other of the few channels which the experiences have made for it, —cannot be determined in some other direction for want of some other channel. But as fast as advancing civilization brings more numerous experiences to each man, as well as accumulations of other men's experiences, past and present, the ever-multiplying connections of ideas that result imply ever-multiplying possibilities of thought. The convictions throughout a wide range of cases are rendered less fixed. Other causes than those which are usual become conceivable; other effects can be imagined; and hence there comes an increasing modifiability of opinion. This modifiability of opinion reaches its extreme in those most highly cultured persons whose multitudinous experiences include many experiences of errors discovered, and whose representativeness of thought is so far-reaching that they habitually call to mind the various possibilities of error, as constituting a general reason for seeking new evidence and subjecting their conclusions to revision.

"If we glance over the series of contrasted modes of thinking which civilization presents, beginning with the savage who, seized by the fancy that something is a charm or an omen, thereafter continues firmly fixed in that belief, and ending with the man of science whose convictions, firm where he is conscious of long-accumulated evidence having no exception, are plastic where the evidence though abundant is not yet overwhelming, we see how an increase in freedom of thought goes along with that higher resentativeness accompanying further mental evolution.'[1]

If now we inquire for a moment into the causes of this higher representativeness of civilized thinking, we shall see most beautifully exemplified the way in which intellectual progress, as it goes on in the human race, is determined by social evolution. Intellectual progress is indeed a cause well as a consequence of the evolution of society; but the dense entanglement of causes and effects our purpose requires us to single out especially the dep of progress in representativeness upon social com since herein will be found the secret of the mental eminence of civilized man. Now the integration of sm tribes into larger and more complex social aggregates, is the fundamental phenomenon in civilization, tends dire to heighten representativeness of thinking by w ning varying the experiences of the memb ty. member of a savage tribe must thin rigidly, improvidently, because are so few in number and so monotonous in character. crease in social complexity renders possible, or indeed directly produces, fresh associations of ideas in greater and greater variety and abundance, so that the decomposition and recombination of thoughts involved in abstraction and generalization is facilitated; and along with this, the definiteness and the plasticity of thought is increased, and the contents of the mind become representative in higher and higher degrees. Thus in every way it is brought before us that sociality has been the great agent in the achievement of man's intellectual pre-eminence, and that it has operated by widening and diversifying human experience, or in other words by increasing the number, remoteness, and heterogeneity of the environing relations to which each individual's actions have had to be adjusted. An inquiry into the genesis of sociality will therefore best show us how the chasm which divides man intellectually from the brute is to be crossed.

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[1] Spencer, op. cit. ii. 524.

But before we proceed to this somewhat lengthy and circuitous inquiry, we may profitably contemplate under a new aspect the intellectual difference which we have assigned as the fundamental one between civilized and primeval man. We have observed that the intellectual superiority of man over brute and of the civilized man over the barbarian essentially consists in a greater capacity for mentally representing objects and relations remote from sense. And we have insisted upon the point that in this capacity of representation the difference between the highest and lowest specimens of normal humanity known to us far exceeds the difference between the lowest men and the highest apes. Now in closest connection with these conclusions stands the physical fact that the chief structural difference between man and ape, as also between civilized and uncivilized man, is the difference in size and complexity of cerebrum. The cerebrum is the organ especially set apart for the compounding and recompounding of impressions that are not immediately sensory. The business of coordinating immediately presentative impressions is performed by the medulla and other subordinate centres. The cerebrum is especially the organ of that portion of psychical life which is entirely representative.[1] Obviously, then, the progress to higher and higher representativeness ought to be accompanied by a well-marked growth of the cerebrum relatively to the other parts of the nervous system. Now, in the light of the present argument, how significant is the fact that the cranial capacity of the modern Englishman surpasses that of the aboriginal non-Aryan Hindu by a difference of sixty-eight cubic inches,[2] while between this Hindu skull and the skull of the gorilla the difference in capacity is but eleven cubic inches! That i say, the difference in volume of brain between the highest and the lowest man is at least six times as great as the difference between the lowest man and the highest ape. And if we were to take into the account the differences in structural complexity, as indicated by the creasing and furrowing of the brain-surface, we should obtain a yet more astonishing contrast. Yet, powerfully as this anatomical fact confirms the position we have all along been upholding, its full value will not be apparent if we are so dazzled by it as to overlook the significance of the lesser difference between the gorilla and the aboriginal inhabitant of India. As the Duke of Argyll very properly observes, we do right in setting a higl value in classification upon the eleven inches which interv between the gorilla and the Hindu than upon the sixty- inches which intervene between the Hindu and the Eng man. For "the significance set by the facts of nature upon difference of eleven cubic inches . . . . is the difference be an irrational brute confined to some one climate and t limited area of the globe,—which no outward conditio modify or improve,—and a being equally adapted to the whole habitable world, with powers, however undeveloped, of comparison, of reflection, of judgment, of reason, with a sense of right and wrong, and with all these capable of accumulated acquisition, and therefore of indefinite advance." Though somewhat exaggerated in what it denies to the brute, and much more in what it claims for the aboriginal man, this statement contains a kernel of truth which is of value for our present purpose, and which is further illustrated by the fact that a minimum of brain-substance "is constantly and uniformly associated with all the other anatomical peculiarities of man. Below that minimum the whole accompanying structure undergoes far more than a corresponding change,—even the whole change between the lowest savage and the highest ape. Above that minimum, all subsequent variations in quantity are accompanied by no changes whatever in physical structure."[1] Here again, though the antithesis is a little too absolutely stated, we have set before us a real distinction. Up to a certain point, the brain and the rest of the body are alike alterable by natural selection and such other agencies as may be concerned in the slow modification of organisms. But when the brain has reached a certain point in size and complexity, the rest of the body ceases to change, save in a few slight particulars, and the agencies concerned in forwarding the process of evolution seem to confine themselves to the brain, and especially to the cerebrum,—the result being marked psychical development, unattended by any notable physical alteration. Here we have reached a fact of prime importance. We may grant to the Duke of Argyll that when those eleven additional cubic inches of brain had been acquired, some kind of a Rubicon had been crossed, and a new state of things inaugurated. What was that Rubicon?

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[1] See above, p. 137.

[2] Lyell, *Antiquity of Man*, p. 84.

The answer has been furnished by Mr. Wallace, and must rank as one of the most brilliant contributions ever yet made to the Doctrine of Evolution. Since inferior animals respond chiefly by physical changes to changes in their environment, natural selection deals chiefly with such changes, to the visible modification of their bodily structure. In the case of sheep or bears, for instance, increased cold can only select for preservation the individuals most warmly coated; or if a race of lions, which has hitherto subsisted upon small and sluggish ruminants until these have been nearly exterminated, is at last obliged to attack antelopes and buffaloes, natural selection can only preserve the swiftest and strongest or most ferocious lions. But when an animal has once appeared, endowed with sufficient intelligence to chip a stone tool and hurl a weapon, natural selection will take advantage of variations in this intelligence, to the comparative neglect of purely physical variations. Communities whose members are best able to meet by intelligent contrivances the changes in the environment will prevail over other communities, and will also be less easily destroyed by physical catastrophes. Still more strikingly must this superior availability of variations in intelligence be exemplified, when the intelligence has progressed so far as to sharpen spears, to use rude bows, to dig pitfalls, to cover the body with leaves or skins, and to strike fire by rubbing sticks, according to the Indian version of the myth of Prometheus.

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[1] Duke of Argyll, *Primeval Man*, pp. 57—64.

So soon, in short, as the intelligence of an animal has, through ages of natural selection and direct adaptation, become so considerable that a slight variation in it is of more use to the animal than any variation in physical structure, then such variations will be more and more constantly selected, while purely physical variations, being of less vital importance to the species, will be relatively more and more neglected. Thus, while the external appearance of such an animal, and the structure of his internal nutritive and muscular apparatus, may vary but little in many ages, his cerebral structure will vary with comparative rapidity, entailing a more or less rapid variation in intellectual and emotional attributes.

Here we would seem to have the key to the singular contrast in the relations of man to contemporary anthropoid apes. We may now understand why man differs so little, in general physical structure and external appearance, from the chimpanzee and gorilla, while, with regard to the special point of cerebral structure and its correlative intelligence, he differs so vastly from these, his nearest living congeners, and the most sagacious of animals save himself. Coupled with what we now know concerning the immense antiquity of the human race, Mr. Wallace's brilliant suggestion goes far to bridge over the interval, which formerly seemed so impracticable, between brute and man. If we

[illegible]

[illegible]

[illegible] characteristic of developing intelligence—is probably also due the complete attainment of the erect position of the body, already partially obtained by the anthropoid apes. Cerebral development thus accounts for all the conspicuous physical peculiarities of man except his bare skin,—a phenomenon for which no satisfactory explanation [illegible] been suggested.

It is a corollary from the foregoing considerations, that no race of organisms can in future be produced through the agency of natural selection and direct adaptation, which shall be zoologically distinct from, and superior to, the human race. As the same causes which physically modify lower species have, for countless ages, modified man directly and greatly in intelligence and only indirectly and slightly in physical constitution, it follows that mankind is destined to advance during future ages in psychical attributes, but is likely to undergo only slight changes in outward appearance. It is by the coordination of intellectual and moral relations that man maintains himself in equilibrium with the physical, intellectual, and moral relations arising in his ever-changing environment. And hence in the future, as in the recent past, the dominant fact in the career of humanity is not physical modification, but CIVILIZATION.

Here we are brought by a new route to the verge of that theory of civilization which I have sought to elucidate in the preceding chapters. We have touched upon a grand truth, of which it would be difficult to overrate the importance. For we can now admit—not as a concession to Mr. St. George Mivart, but as a legitimate result of our own method of inquiry—that when "the totality of man's being" is taken into the account, the difference between ape and mushroom is less important than the difference between ape and man. And without conceding aught to that superlative nonsense known as the "doctrine of special creations," we may admit, with the Duke of Argyll, that the eleven cubic inches of brain-space, by which the aboriginal Hindu surpasses the gorilla, have a higher value, for purposes of classification, than the sixty-eight cubic inches by which the modern Englishman surpasses the Hindu. We now see what kind of a Rubicon it was which was crossed when those eleven cubic inches of brain (or even when four or five of them) had been gained. The crossing of the Rubicon was the point at which natural selection began to confine itself chiefly to variations in psychical manifestation. The ape-like progenitor of man, in whom physical and psychical changes had gone on *pari passu* for countless æons, until he had reached the grade of intelligence implied by the possession of a brain four or five inches more capacious than that of the gorilla, had now, as we may suppose, obtained a brain upon which could be devolved, to a greater and greater extent, the task of maintaining relations with the environment. Then began a new chapter in the history of the evolution of life. Henceforward the survival of the fittest, in man's immediate ancestry, was the survival of the cerebrums best able to form representative combinations. The agencies which had hitherto been at work in producing an organic form endowed with rare physical capacities, now began steadfastly to labour in producing a mind capable to a greater and greater extent of ideally resuscitating and combining relations not present to the senses.

But immense as was the step thus achieved in advance, the progress from brute to man was not yet accomplished. As we have already shown, the circumstances which by widening and diversifying experience have mainly contributed to heighten man's faculty of representativeness, have been for the most part circumstances attendant upon man's sociality, or the capacity of individuals for aggregating into communities of increasing extent and complexity. Here we become involved in considerations relating to the emotions as well as to the intelligence. The capacity for sustaining the various relationships implied by the existence of a social aggregate—whether in the case of a primeval family community or of a modern nation—cannot be explained without taking into the account the genesis of those moral feelings by the possession of which man has come to differ from the highest brutes even more conspicuously than by his purely intellectual achievements. The task now before us, therefore, is to explain the genesis of the moral feelings which lie at the bottom of sociality in the human race; and with reference to this question I shall presently have a suggestion to offer, which will be found as serviceable as it is interesting and novel. Let us for the moment, however, consider the implications of some of the current ethical theories, and especially let us examine the scientific basis of what is too crudely designated as Utilitarianism.

CHAPTER XXII.

GENESIS OF MAN, MORALLY.

THERE are two things, said Kant, which fill me with awe because of their sublimity,—the starry heavens above us, and the moral law within us. From the modern point of view there is interest as well as instruction to be found in the implied antithesis. While in the study of the stellar universe we contemplate the process of evolution on a scale so vast that reason and imagination are alike baffled in the effort to trace out its real significance, and we are overpowered by the sense of the infinity that surrounds us; on the other hand, in the study of the moral sense we contemplate the last and noblest product of evolution which we can ever know,—the attribute latest to be unfolded in the development of psychical life, and by the possession of which we have indeed become as gods, knowing the good and the evil. The theorems of astronomy and the theorems of ethics present to us the process of evolution in its extremes of extension and of intension respectively. For although upon other worlds far out in space there may be modes of existence immeasurably transcending Humanity, yet these must remain unknowable by us. And while this possibility should be allowed its due weight in restraining us from the vain endeavour to formulate the infinite and eternal Sustainer of the universe in terms of our own human nature, as if the highest symbols intelligible to us were in reality the highest symbols, nevertheless it can in no way influence or modify our science. To us the development of the noblest of human attributes must ever remain the last term in the stupendous series of cosmic changes, of which the development of planetary systems is the first term. And our special synthesis of the phenomena of cosmic evolution, which began by seeking to explain the genesis of the earth and its companion worlds, will be fitly concluded when we have offered a theory of the genesis of those psychical activities whose end is to secure to mankind the most perfect fulness of life upon this earth, which is its dwelling-place.

The great philosopher whose remark has suggested these reflections would not, however, have been ready to assent to the interpretation here given. Though Kant was one of the chief pioneers of the Doctrine of Evolution, having been the first to propose and to elaborate in detail the theory of the nebular origin of planetary systems, yet the conception of a continuous development of life in all its modes, physical and psychical, was not sufficiently advanced, in Kant's day, to be adopted into philosophy. Hence in his treatment of the mind, as regards both intelligence and emotion, Kant took what may be called a statical view of the subject; and finding in the adult civilized mind, upon the study of which his systems of psychology and ethics were founded, a number of organized moral intuitions and an organized moral sense, which urges men to seek the right and shun the wrong, irrespective of utilitarian considerations of pleasure and pain, he proceeded to deal with these moral intuitions and this moral sense as if they were ultimate facts, incapable of being analyzed into simpler emotional elements. Now as the following exposition may look like a defence of utilitarianism, it being really my intention to show that utilitarianism in the deepest and widest sense is the ethical [illegible] imperatively required by the facts, it is well to [illegible] the outset that the existence of a moral sense and [illegible] intuitions in civilized man is fully granted. It is [illegible] that civilized man possesses a complex group of [illegible] leading him to seek the right and avoid the [illegible] without any reference to considerations of utility: [illegible] entirely with those utilitarian disciples of [illegible] apparently refer these ethical emotions [illegible] of experiences of pleasure and pain in [illegible] individual. So long as the subject is [illegible] a statical point of view, so long as [illegible] is studied without reference to an[illegible] the follower of Kant can always hold [illegible] the follower of Locke, in ethics as well [illegible] When the Kantian asserts that the in[illegible] wrong, as well as the intuitions of [illegible] independent of experience, he occupies [illegible] impregnable, so long as the organization [illegible] successive generations is left out of [illegible] on two occasions of supreme [illegible] the Doctrine of Evolution lead[illegible] ground upon which the disciples of [illegible] Locke can dwell in peace together. [illegible] experience-test and the incon[illegible] are, when deeply considered, but [illegible] same thing. We have seen that [illegible] standpoint from which the experience-theory [illegible] theory of knowledge may be regarded as [illegible] supplementing each other. We shall presently [illegible] that the so-called doctrine of utili[illegible] the doctrine of moral intuitions are by no [illegible] with one another as may at first [illegible] As soon as we begin to study the subject dynami[illegible] is shown in a new light. Admitting the truth of the Kantian position, that there exists in us a moral sense for analyzing which our individual experience does not afford the requisite data, and which must therefore be regarded as ultimate for each individual, it is nevertheless open to us to inquire into the emotional antecedents of this organized moral sense as exhibited in ancestral types of psychical life. The inquiry will result in the conviction that the moral sense is not ultimate, but derivative, and that it has been built up out of slowly organized experiences of pleasures and pains.

But before we can proceed directly upon the course thus marked out, it is necessary that we should determine what are meant by pleasures and pains. What are the common characteristics, on the one hand, of the states of consciousness which we call pleasures, and, on the other hand, of the states of consciousness which we call pains? According to Sir William Hamilton, "pleasure is a reflex of the spontaneous and unimpeded exertion of a power of whose energy we are conscious; pain is a reflex of the overstrained or repressed exertion of such a power." That this theory, which is nearly identical with that of Aristotle, is inadequate to account for all the phenomena of pleasure and pain, has been, I think, conclusively proved by Mr. Mill. With its complete adequacy, however, we need not now concern ourselves; as we shall presently see that a different though somewhat allied statement will much better express the facts in the case. Hamilton's statement, however inadequate, is illustrated by a number of truths which for our present purpose are of importance. A large proportion of our painful states of consciousness are attendant upon the inaction, or what Hamilton less accurately calls the "repressed exertion," of certain organic functions. According to the character of the functions in question, these painful states are known as cravings or yearnings. Inaction of the alimentary canal, and that molecular inaction due to deficiency of water in the system, are attended by feelings of hunger and thirst, which vary from slight discomfort to intense agony according as the inaction is prolonged. Of kindred character are the acquired cravings for tobacco, alcohol, and other narcotics. Inaction of the muscles causes great discomfort in children who are compelled to sit still, and grown persons feel similar annoyance when the enforced stillness is long enough kept up. Prisoners kept in dark cells soon feel an intense craving for light, which in time becomes scarcely less intolerable than raging hunger. A similar explanation suffices for the emotional yearnings involved in home-sickness, ennui, deprivation of the approval of our fellow-creatures, or in separation from our favourite pursuits. All these painful states are due to the enforced inaction of certain feelings, social or æsthetic. And in similar wise, as Mr. Spencer observes, the bitter grief attendant upon the death of a friend results from the ideal representation of a future in which certain groups of habitual emotions must remain inactive or unsatisfied by outward expression.

The objection may be made that all this is but an elaborate way of saying that certain pains result from the deprivation of certain pleasures. But since such an objection, in its very statement, recognizes that certain kinds of unimpeded activity, physical or psychical, are pleasures, it need not disturb us, or lead us to under-estimate the value of Hamilton's suggestion. Let us note next that excessive action of any function, equally with deficient action, is attended by pain. Local pain results from intensified sensations of heat, light, sound, or pressure; and though it may be in some cases true, as Mr. Spencer asserts, that sweet tastes are not rendered positively disagreeable by any degree of intensity,[1] the alleged fact seems quite contrary to my own experience, and to that of several other persons whom I have questioned. Other local pains, as in inflammation and sundry other forms of disease, are apparently due to increased molecular activity in the parts affected. And the feelings of pain or discomfort both local and systemic, attendant upon over-exercise, over-eating, or excessive use of a narcotic, are to be similarly explained.

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[1] Spencer, *Principles of Psychology*, vol. i. p. 276.

Thus we may say that pleasure, generally speaking, is "the concomitant of an activity which is neither too small nor too great," and we get at the significance of the Epicurean maxim, *μηδὲν ἄγαν*. But this doctrine, as already hinted, is by no means complete. For, as Mr. Mill and Mr. Spencer ask, "What constitutes a medium activity? What determines that lower limit of pleasurable action below which there is craving, and that higher limit of pleasurable action above which there is pain?" And furthermore, how happen there to be certain feelings (as among tastes and odours) which are disagreeable in all degrees of intensity, and others that are agreeable in all degrees of intensity? The answer, as Mr. Spencer shows, is to be sought in the study of the past conditions under which feelings have been evolved.

If the tentacles of a polyp are rudely struck by some passing or approaching body, the whole polyp contracts violently in such a manner as to throw itself slightly out of the way; but if a fragment of assimilable food, floating by, happens to touch one of the tentacles gently, the tentacle grasps it and draws it slowly down to the polyp's digestive sac. Now between these contrasted actions there is no such psychical difference as accompanies the similarly contrasted human actions of taking food and ducking the head to avoid a blow; for the polyp's contractions, being simply reflex actions of the lowest sort, are unattended by states of consciousness, either agreeable or disagreeable. Nevertheless there is one respect in which the two cases perfectly agree. In both cases there is a seeking of that which is beneficial to the organism, and a shunning of that which is injurious. And while, in the case of the polyp, there is no conscious pleasure or pain, we may fairly surmise that, as soon as any animal's psychical life becomes sufficiently complex to be attended by distinct states of consciousness, the presence of that which is beneficial is accompanied by a pleasurable feeling which leads to the seeking of it, while the presence of that which is injurious is accompanied by a painful feeling which leads to the shunning of it. Our surmise is strengthened as we reconsider the human actions lately enumerated, and observe that the abnormal activity of a function, either in deficiency or in excess, is injurious, while the normal activity of a function in balance with its companion functions is beneficial. As Mr. Spencer says, "in a mutually dependent set of organs having a consensus of functions, the very existence of a special organ having its special function, implies that the absence of its function must cause disturbance of the consensus,—implies too, that its function may be raised to an excess which must cause disturbance of the consensus, —implies, therefore, that maintenance of the consensus goes along with a medium degree of its function." In accordance with this view, we may note that hunger and thirst are feelings attendant upon a kind of functional inaction which is harmful, and even fatal if prolonged; that inaction or excessive action of the muscles is injurious as well as painful; that the intense heat and cold, and the violent pressure, which cause distress, will also cause more or less injury, and may cause death; that the discomfort following repletion and narcosis is the concomitant of a state of things which, if kept up, must end in dyspepsia, or other forms of disease, entailing usually a permanent lowering of nutrition; and that the intense sounds and lights which distress the ear and eye also tend to produce deafness and blindness. And in like manner, the enforced inaction of the social and æsthetic feelings, which is attended by mental discomfort, is also attended in the long run by a diminution of the fulness and completeness of psychical life, which in extreme cases may result in consumption, insanity, or narcotic craving.

It would seem, therefore, that the class of cases upon which Hamilton relied will justify an interpretation much deeper than the one which he proposed for them. They will apparently justify us in asserting that pleasure is a state of consciousness accompanying modes of activity which tend to increase the fulness of life of an organism, while pain is a state of consciousness accompanying modes of activity which tend to diminish the fulness of life. Before considering the objections to this doctrine,—which, though at first sight formidable, will disappear on further analysis,—let us note, with Mr. Spencer, that, on the theory of evolution, "races of sentient creatures could have come into existence under no other conditions." Omitting the cases which, in human psychology, are complicated by the foresight of remote or inconspicuous consequences, Mr. Spencer observes that Pleasure is "a feeling which we seek to bring into consciousness and retain there," while Pain is "a feeling which we seek to get out of consciousness and to keep out." Hence it follows that "if the states of consciousness which a creature endeavours to maintain are the correlatives of injurious actions, and if the states of consciousness which it endeavours to expel are the correlatives of beneficial actions, it must quickly disappear through persistence in the injurious and avoidance of the beneficial." In other words, even supposing a race of animals could come into existence, which should habitually seek baneful actions as pleasurable, and shun useful actions as painful, natural selection would immediately exterminate it. Our supposition is therefore a hibernicism: under the operation of natural selection no such race could ever come into existence. Only those races can exist whose feelings, on the average, result in actions which are in harmony with environing relations. Accordingly we may rest upon a still deeper and firmer basis our doctrine of pleasure and pain, and assert that Pleasure is a state of consciousness accompanying the relatively complete adjust-

[illegible] relations, while Pain is a state of [illegible] upon the discordance between inner [illegible]

[illegible] class of facts which at first seem [illegible] the theory but which in reality serve [illegible] animals now and then perform self- [illegible] circumstances which make it diffi- [illegible] the performance is not pleasurable. [illegible] vegetable poisons are disagreeable to [illegible] always the case; and hence animals [illegible] to perish after a greedy meal upon some [illegible] as in the case of the moth which, [illegible] shrivelled in a fruitless fire," there [illegible] environment for which there is no [illegible] established in the organism. The [illegible] who ignorantly drinks a [illegible] muscular activity by [illegible] The dynamic theory of life [illegible] internal relations answer- [illegible] Were it so, life would [illegible] new emergencies there [illegible] Now manifestly if the whole [illegible] lighted candles. [illegible] must be gene- [illegible] the race must be [illegible] a district where [illegible] be maintained only [illegible] low in intelligence, a [illegible] be generated so that the noxious [illegible] must become [illegible] but if the [illegible] like a bird or [illegible] is identi- [illegible] while along [illegible] representation of danger. Hence it is not necessary to the maintenance of a race like mankind that all poisons should be bitter, or that injurious actions, newly tried, should painfully affect any of the senses. The work of making the needful adjustments is thrown largely upon the cerebrum, with its power of forming ideal sequences like those formerly experienced, and of directing action so as to anticipate them. Here, indeed, we come suddenly upon one of the conditions of human progressiveness, as above illustrated.

We can now begin to see why man finds pleasure in so many kinds of activity which are noxious to himself. In no other animal are the failures of adjustment between pleasurable and painful states, and beneficial and hurtful actions, so numerous or so conspicuous as in man. Though in the adjustments upon which the maintenance of life immediately depends, the correspondence is of necessity unimpaired, yet in those less essential adjustments concerned in keeping up the greatest possible fulness of life, there is frequent and lamentable imperfection. Thus,—to take one instance out of a hundred,—we continually see pleasurable states of consciousness associated with hurtful actions in the cases of men who ruin themselves by the use of narcotics. The fact that men, who are so much wiser than brutes, should often persist in conduct unworthy of brute intelligence, has long formed the theme of much sage but fruitless moralizing. By Calvinistic theologians such phenomena were formerly cited in proof of the theory that man is morally the lowest of creatures, having been rendered thoroughly unsound by the eating of the apple in Eden. It is needless to say that science offers a very different explanation. It follows from our inquiry into the causes of organic evolution,[1] that the adjustments which tend to maintain the highest fulness of life can be kept up only by natural selection or by direct equilibration. Now we have already had occasion to notice that in the human race, partly on account of the extreme complexity of its individual organization, partly on account of superadded social conditions, the action of natural selection is to a great extent checked. I do not allude to the fact that the supremely important human sympathies, which have grown up in the course of social evolution, compel us to protect the idle and intemperate, so that, instead of starving, they are "enabled to multiply at the expense of the capable and industrious." For far deeper than this lies the circumstance that "there are so many kinds of superiorities which severally enable men to survive, notwithstanding accompanying inferiorities, that natural selection cannot by itself rectify any particular unfitness; especially if, as usually happens, there are coexisting unfitnesses which all vary independently."[1] In a race of inferior animals a function in excess is quickly reduced by natural selection, because, owing to the universal slaughter, the highest completeness of life possible to a given grade of organization is required for the mere maintenance of life. But under the conditions surrounding human development, a function in excess may remain in excess provided its undue exercise is not such as is incompatible with life. Through countless ages, for example, the feelings which insure the maintenance of the race have been strengthened by natural selection, because of their prime importance to every race. But under the conditions of civilized life, the sexual passion has become a function in excess, which natural selection is powerless to reduce, because, although it is probably the source of more crime and misery than any other excessive function, and therefore detracts more from complete individuation or the fulness of human life than any other, it is nevertheless but seldom incompatible with the maintenance of life. In all such cases, mankind has so many other functions, besides the excessive ones, which enable it to subsist and achieve progress in spite of them, [illegible] reduction to the normal standard is left for the slow process of direct equilibration.

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[1] See above, part ii. chap. xii.

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[1] [illegible]

The action of direct equilibration, in turn, is greatly complicated, among the progressive races, by the rapid and extensive change of the social environment from age to age. A new set of readjustments needs to be made before the old ones are completed; and the result is that there are always a number of functions somewhat out of balance. When civilization is rapidly progressing, each generation of men is forced into kinds of activity to which the inherited emotional tendencies, and in some cases even the inherited physical constitutions, are not thoroughly adapted. Hence the number and variety of pathological phenomena, both mental and physical, is greater in civilized than in savage communities. As might be expected, the present century, which has witnessed a far more extensive revolution in the modes of human activity than any previous age, exhibits numerous instances of these minor failures of adjustment. To take the most conspicuous example,—the progress of science and industry during the past three generations have raised the average standard of comfortable living so greatly and so suddenly, that to attain this standard an excessive strain is put upon men's powers. In many respects, it is harder to live to-day than it was a hundred years ago. As a general rule we are overworked until late in life, in the mere effort to secure the means of maintaining life. Not only does this continual overwork entail a serious disturbance of the normal equilibrium between pleasures and pains and the correlative benefits and injuries, since it involves the undue exertion of certain faculties and the undue repression of others, but there is further disturbance due to the specific character of the overwork. Throughout a very large and constantly increasing portion of the community, the excessive labour is intellectual labour; the abnormal strain comes upon the nervous system. [illegible] task of maintaining the correspondence with environing [illegible] has been [illegible] system, and [illegible] been thrown [illegible] during the past [illegible] to a formidable [illegible] not simply [illegible] in the shape of [illegible] inordinate anxiety. [illegible] the industrial [illegible] thrust on the [illegible] activities,—activities [illegible] feelings inherited from [illegible] with those more [illegible] feelings which [illegible] Hence manifold dis[illegible] years in a [illegible] brings about a [illegible] feelings are [illegible] requirements [illegible] appropriate, become [illegible] readiness to those [illegible] of exer[illegible] gratifying are [illegible] they are to con[illegible] feelings, come [illegible] guidance of inherited feelings is [illegible].

Further [illegible] to con[illegible] stated, into an [illegible] results now obtained. We see that natural selection, acting less rigidly under the limitations imposed by social evolution, fails to [illegible]

[illegible] Spencer [illegible]

reduce functions that are in excess, and leaves them to be reduced by direct equilibration. The process is accordingly slow, since direct adaptation to a rapidly changing environment is attended by the appearance of minor unfitnesses which further complicate the emotional disturbance, and disarrange the normal relations between incentives and actions. We need not, therefore, be surprised at the fact that men often find pleasure in detrimental activities; nor need we indorse the Puritanic or ascetic theory, suggested partly by the contemplation of this fact, "that painful actions are beneficial and pleasurable actions detrimental." For if this were to any considerable extent the case, sentient life would inevitably disappear from the face of the earth. The cases which we have cited belong to ethical pathology. And just as pathologic phenomena do not invalidate the laws of physiology, just as the dynamic theory of life is not invalidated by the fact that mal-adjustments are continually met with, so neither do cases of moral disease invalidate the corollary which inevitably follows from the Doctrine of Evolution, "that pleasures are the incentives to life-supporting acts, and pains the deterrents from life-destroying acts."

We are now prepared to deal with the phenomena of Right and Wrong, and to notice how they become distinguished from the phenomena of Pleasure and Pain. Though the foregoing discussion forms the basis for a general doctrine of morality, it is nevertheless an inadequate basis, until properly supplemented. The existence of a moral sense has purposely been as far as possible unrecognized; for I believe that in dealing with these complex subjects, little can be accomplished, save on the plan of separately cornering the various elements in the problem, and flooring them one by one. Any philosophy of ethics, therefore, which might be founded upon the preceding analysis, could be nothing more than a theory [illegible] Hedonism, recognizing no other incentive to proper action [illegible] one's self. By one of the innumerable tricks which the misuse of current words plays with the understanding, the so-called utilitarian theory has been, and [illegible] identified with this kind of hedonistic [illegible] which is in truth its very antipodes. The [illegible] that involved in the accusation of fatalism, [illegible] at those who maintain the obvious and [illegible] that moral actions conform to law. But [illegible] the entire difference between the [illegible] and the meanest self-fondling, is as [illegible] pleasure and pain, which if taken [illegible] the well-being of the community [illegible] possible omitted from the account. W[illegible] to social phenomena, [illegible] their effects upon the fulness [illegible] with the incentives to [illegible] the foregoing considerations [illegible] the so-called utilitarian theory [illegible] the well-being of the community [illegible] that of the individual, [illegible] While the actions deemed [illegible] fulness of life of the [illegible] those which conduce [illegible] And while the actions [illegible] the fulness of life [illegible] wrong are those which [illegible] According [illegible] the conduct [illegible] the commun- [illegible] as the selfish [illegible] the community. [illegible] which primarily [illegible] long-continued social [illegible] man, we have [illegible] utilitarian [illegible], as properly [illegible] in our beneficial to Humanity, while actions morally wrong are those which are detrimental to Humanity.

Are we to maintain, then, that when we approve of certain actions, we do so because we consciously and deliberately reason out, in each particular case, the conclusion that these actions are beneficial to mankind? By no means. Not only is it that the highest science cannot always enable us to say surely of a given action that it is useful to mankind, but it is also that we do not stop to apply science to the matter at all. We approve of certain actions and disapprove of certain actions quite instinctively. We shrink from stealing or lying as we shrink from burning our fingers; and we no more stop to frame the theorem that stealing and lying, if universally practised, must entail social dissolution and a reversion to primeval barbarism, than we stop to frame the theorem that frequent burning of the fingers must entail an incapacity for efficient manual operations. In short, there is in our psychical structure a moral sense which is as quickly and directly hurt by wrong-doing or the idea of wrong-doing as our tactile sense is hurt by stinging.

Shall we, then, maintain, as a corollary from the Doctrine of Evolution, that our moral sense is due to the organic registration, through countless ages, of deliberate inferences that some actions benefit Humanity, while others injure it? Shall we say that the primeval savage began by reasoning his way to the conclusion that if treachery were to be generally allowed, within the limits of the tribe, then the tribe must succumb in the struggle for existence to other tribes in which treachery was forbidden; and that, by a gradual organization of such inductions from experience, our moral sense has slowly arisen? This position is no more tenable than the other. Mr. Richard Hutton and Mr. St. George Mivart would seem to have attributed to Mr. Spencer some such doctrine. But Mr. Spencer is too profound a to ignore so completely the conditions under which permanent emotional states are generated. Our moral sense has arisen in no such way. But to understand the way in which it has arisen, we must recur to our fundamental problem, and seek for the conditions which first enabled social evolution, as distinguished from organic evolution, to start upon its career.

It is now time to propose an answer to the question, already twice suggested and partly answered, How did social evolution originate? Starting from the researches of Sir Henry Maine, which are supported by those of Messrs. Tylor, M'Lennan, and Lubbock, we have come to the conclusion that it originated when families, temporarily organized among all the higher gregarious mammals, became in the case of the highest mammal permanently organized. Starting from the deductions of Mr. Wallace, we have seen reason for believing that civilization originated when in the highest mammal variations in intelligence became so much more important than variations in physical structure that they began to be seized upon by natural selection to the relative exclusion of the latter. In the permanent family we have the germ of society. In the response to outer relations by psychical changes, which almost completely subordinate physical changes, we have the germ of civilization. Let us now take a step in advance of previous speculation,[1] and see what can be done by combining these two theorems, so that the permanent organization of families and the complex intelligence of the highest mammal will appear in their causal relations to each other.

Many mammals are gregarious, and gregariousness implies incipient power of combination and of mutual protection. But gregariousness differs from sociality by the absence of definitive family relationships, except during the brief and intermittent periods in which there are helpless offspring to be protected. Now it might be maintained that the complex intelligence of the highest mammal led him vaguely to recognize the advantage of associating in more and more permanent groups for the sake of mutual protection. From this point of view Mr. Darwin argues that men were originally a race of weak and mild creatures like chimpanzees, and not a race of strong and ferocious creatures like gorillas, and were accordingly forced to combine because unable to defend themselves singly. It is undeniable that man is, relatively to his size, a weak animal; and there is much value in Mr. Darwin's suggestion in so far as it goes to explain the origin of gregariousness among those primates who were the ancestors of man. Nevertheless, it can hardly be said to explain Sociality as distinguished from Gregariousness. It may also be argued that the superior sagacity even of the lowest savage makes him quite a formidable antagonist to animals much more powerful than himself. Besides, the study of savage life brings out results at variance with the notion of man's primitive gentleness. A strong case might be made in support of the statement that uncivilized man is an extremely ferocious animal, and that among savage races, which certainly differ very notably in natural ferocity of disposition, the most ferocious tribes are often the most likely to become dominant and assist social integration by subduing other tribes. The earliest annals of the highest of human races, the Aryan, certainly bear witness to extreme ferocity, checked and determined in its direction by a moral sense further developed than that of savages. While recognizing, therefore, the value of Mr. Darwin's suggestion, so far as it goes, I believe that the true explanation lies much further beneath the surface.

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[1] The latest writer upon these subjects is inclined to give up the problem as insoluble. "I at least find it difficult to conceive of men, at all like the present men, unless existing in something like families, that is, in groups avowedly connected, at least on the mother's side, and probably always with a vestige of connection, more or less, on the father's side, and unless these groups were, like many animals, greg [illegible] nder a leader more or less fixed. It is almost beyond imagination [illegible] n, could by any sort of process have gained this s [illegible] *Physics and Politics*, p. 136.

It will be remembered that, in treating of the parallel evolution of the mind and the nervous system,[1] it was shown that the increase of intelligence in complexity and speciality involves a lengthening of the period during which the nervous connections involved in ordinary adjustments are becoming organized. Even if the physical interpretation there given should turn out to be inadequate, the fact remains unquestionable that while the nervous connections accompanying a simple intelligence are already organized at birth, the nervous connections accompanying a complex intelligence are chiefly organized after birth. Thus there arise the phenomena of infancy, which are non-existent among those animals whose psychical actions are purely reflex and instinctive. Infancy, psychologically considered, is the period during which the nerve-connections and correlative ideal associations necessary for self-maintenance are becoming permanently established. Now this period, which only begins to exist when the intelligence is considerably complex, becomes longer and longer as the intelligence increases in complexity. In the human race it is much longer than in any other race of mammals, and it is much longer in the civilized man than in the savage.[2] Indeed among the educated classes of civilized society, its average duration may be said to be rather more than a quarter of a century, since during all this time those who are to live by brain-work are simply acquiring the capacity to do so, and are usually supported upon the products of parental labour.

It need not be said that, on the general theory of evolution, the passage from the short infancy of other primates to the relatively long infancy witnessed among the lowest contemporary savages, cannot have been a sudden one.[3] But a special reason may be assigned why Nature, which never makes long jumps, must have been incapable of making this particular jump. Throughout the animal kingdom the period of infancy is correlated with feelings of parental affection, sometimes confined to the mother, but often shared by the father, as in the case of animals which mate. Where, as among the lower animals, there is no infancy, there is no parental affection. Where the infancy is very short, the parental feeling, though intense while it lasts, presently disappears, and the offspring cease to be distinguished from strangers of the same species. And in general the duration of the feelings which insure the protection of the offspring is determined by the duration of the infancy. The agency of natural selection in maintaining this balance is too obvious to need illustration. Hence, if long infancies could have suddenly come into existence among a primitive race of ape-like men, the race would have quickly perished from inadequate persistence of the parental affections. The prolongation must therefore have been gradual, and the same increase of intelligence to which it was due must also have prolonged the correlative parental feelings, by associating them more and more with anticipations and memories. The concluding phases of this long change may be witnessed in the course of civilization. Our parental affections now endure through life; and while their fundamental instinct is perhaps no stronger than in savages, they are, nevertheless, far more effectively powerful, owing to our far greater power of remembering the past and anticipating the future.

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[1] See above, part ii. chap. xvi.

[2] Possibly there may be a kindred implication in the fact that women attain maturity earlier than men.

[3] In this connection it is interesting to observe that the phenomena of infancy seem to be decidedly more marked in the anthropoid apes than in other non-human primates. At the age of one month the orang-outang begins

I believe we have now reached a very thorough and satisfactory explanation of the change from Gregariousness to

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to learn to walk, holding on to convenient objects of support, like a human infant. Up to this time it lies on its back, tossing about and examining its hands and feet. A monkey at the same age has reached maturity, so far as locomotion and prehension are concerned. See Mr. Wallace's interesting experience with an infant orang-outang, in his *Malay Archipelago*, vol. i. pp. 68--71.

[illegible]. Bear in mind that I am not indulging in pure hypothesis. The prolongation of infancy accompanying the development of intelligence, and the correlative extension of parental feelings, are both established by observation wherever observation is possible. And to maintain that the correlation of these phenomena was kept up during an epoch which is hidden from observation, and can only be known by inference, is [illegible] involving no other assumption than that the operations of nature are uniform. [illegible] believing that the human race was created by miracle in a single day with all its attributes, physical and psychical, fully developed and proportioned just as they now are, the present inquiry is, of course, devoid of significance. But for the evolutionist there would seem to be no alternative [illegible] when once propounded the present series of inferences.

For the process here described, when long enough continued, must inevitably differentiate and integrate a herd or troop of gregarious apelike men into a number of small family communities [illegible] must [illegible] periods in [illegible] so long [illegible] while the [illegible] begin [illegible] long in [illegible] same [illegible] the older [illegible] association [illegible] with strangers. [illegible] union [illegible] fami[illegible] of the family thus [illegible] bravest or most [illegible] gradually becomes a clan, the members of which are united by ties considerably stronger than those which ally them to members of adjacent clans, with whom they may indeed combine to resist the aggressions of yet further outlying clans, or of formidable beasts, but towards whom their feelings are usually those of hostile rivalry. It remains to add, that the family groups thus constituted differ widely in many respects from modern families, and do not afford the materials for an idyllic picture of primeval life. Though always ready to combine against the attack of a neighbouring clan, the members of the group are by no means indisposed to fight among themselves. The sociality is but nascent: infants are drowned, wives are beaten to death, and there are deadly quarrels between brothers. So in modern families evanescent barbarism shows itself in internal quarrels, while nevertheless injury offered from without is resented in common. A more conspicuous difference is the absence of monogamy in the primitive clan. It has been, I think, demonstrated,—and for the evidence in detail I would refer to Sir John Lubbock's excellent treatise on the "Origin of Civilization," and to the learned works of M'Lennan and Tylor,—that in the primitive clan all the women are the wives of all the men. Traces of this state of things, which some of our half-educated "reformers" would fain restore, are found all over the world, both in modern savage communities and in traditional observances preserved by communities anciently civilized. There was also, as Sir Henry Maine has proved, entire community of lands and goods, and the individual possessed no personal rights as against the interests of the clan. And let us note, in conclusion, that this state of things, while chiefly brought about by the process of direct equilibration above described, is just that which natural selection must assist and maintain so long as the incipient community is small and encompassed by dangers.

Thus we cross the chasm which divides animality from humanity, gregariousness from sociality, hedonism from morality, the sense of pleasure and pain from the sense of right and wrong. For note that by the time integration has resulted in the establishment of a permanent family group with definite relationships between the members, the incentives to action in each member of the group have become quite different from what they were in a state of mere gregariousness. Sympathy, or the power of ideally reproducing in one's self the pleasures and pains of another person, is manifested in a rudimentary form by all gregarious animals of moderate intelligence. Not unfrequently, as Mr. Darwin shows, a baboon has been known to risk his life to save that of a comrade; and the higher apes habitually take under their care young orphans of their own species. It is evident that this power of sympathy must be strengthened and further developed when a number of individuals are brought into closer and more enduring relationships, even though these come far short of what, from our modern ethical standard, would be termed loving. Affection in the savage clan is but partially preventive of fiendish cruelty; yet there is an ability in the members to understand each other's feelings, and there is a desire for the approbation of fellow-clansmen. Kinship in blood, as well as community of pursuits and interests, promotes these feelings. Even to-day we can usually understand the mental habits, desires, and repugnances of our own immediate kindred better than we can understand those of other people unrelated to us, even though circumstances may now and then have led us to prefer the society of the latter. We can more readily admire their excellences and condone their faults, for their faults and excellences are likely to be in a measure our own.

Given this rudimentary capa[illegible]pathy, we can see how family in[illegible] must al[illegible]plicate the emotional incenti[illegible]tion. W[illegible]vidual may still exercise his [illegible]redatory [illegible] strangers and lower animals, and will, indeed, be more highly approved the more he does so, on the other hand there is a curb upon his exercise of them within the limits of the clan. There is a nascent public opinion which lauds actions beneficial to the clan, and frowns upon actions detrimental to it; though for this it is not necessary that there should be a generalization of the effects of certain actions, any more than a generalization of the effects of hunger is needed to insure the individual's approval of eating. The mere present sense of collective pleasure or pain is enough to organize the complex feeling. For example, when a marauding expedition upon a neighbouring clan is defeated by the cowardice or treachery of one of the party, the offender is perhaps beaten, kicked, or killed. The present sense of collective pain immediately prompts the actions which tend to repress the cowardice or treachery. On the other hand, the pleasurable states which result in all the members of the clan, in common, after an exhibition of successful bravery, immediately generate approval of the man who is brave, along with the desire to imitate him. In short,—to quote Mr. Spencer,—one of the things that come to be strongly associated in the mind of the young savage, with marks of approval, "which are symbolical of pleasures in general, is courage; and one of the things that comes to be associated in his mind with frowns and other marks of enmity, which form his symbol of unhappiness, is cowardice. These feelings are not formed in him because he has reasoned his way to the truth that courage is useful to his tribe, and by implication to himself, or to the truth that cowardice is a cause of evil. In adult life he may, perhaps, see this; but he certainly does not see it at the time when bravery is thus associated in his consciousness with all that is good, and cowardice with all that is bad. Similarly there are produced in him feelings of inclination [illegible] repugnance towards other lines of conduct that have [illegible]blished or interdicted, because they are beneficial

or injurious to the tribe; though neither the you
adults know why they have become established or i
Instance the praiseworthiness of wife-stealing and t
ness of marrying within the tribe."[1] In these
establishment of permanent family relationships
new incentives to action, unknown in the previou
mere gregariousness, which must often, and in som
habitually, overrule the mere animal incentives co
personal pleasures and pains. The good of the
must begin to yield to the good of the community.

Next in order comes the genesis of the feelings
and remorse, which are the fundamental ingredien
science. This part of the subject has been ably
Mr. Darwin, whose chapter on the Moral Sense is
most profound and suggestive chapters in his recen
the "Descent of Man." Mr. Darwin points to the
fact, that, while the incentives to actions benefic
community are always steadily in operation, on
hand the purely selfish impulses, although frequen
enough to acquire temporary mastery over the
nevertheless accompanied by pleasures that are bri
tion and leave behind memories of comparativ
vividness. Now, when intelligence has progressed
where there is some definite memory of parti
actions, the workings of the mind, with reference t
begin to assume a more strictly moral character.
the moment of action a man may yield to the
gratifying hunger, or revenge, or cupidity, at the c
lating the rules enforced by social sanctions, yet
when "past and weaker impressions are contraste
ever-enduring social instincts, retribution will su
Man will then feel dissatisfied with himself, and w
with more or less force, to act differently for the fu
is conscience; for conscience looks backward and j

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[1] Spenc[illegible] Dis[illegible]

actions, inducing that kind of dissatisfaction which, if weak, we call regret, and, if severe, remorse."[1]

All these varieties of incentive are next reinforced by incentives of a mysterious and supernatural character. When intelligence has progressed to the point where some curiosity is felt concerning the causes of phenomena,—a point barely reached by the lowest contemporary savages,—mythologies begin to be framed. A mythology is a rudimentary cosmic philosophy; and let me note, in passing, that an uncivilized race must have attained considerable latent philosophic capacity before it can construct a rich mythology,—instance the luxuriant folk-lore of Greece as contrasted with the scanty mythology of savages. Now, the earliest kind of philosophy is fetichism, by which natural phenomena are attributed to the volitions of countless supernatural agencies. What are these agencies? Recent researches have elicited the fact that they are supposed to be the ghosts of the dead ancestors of the tribe. The dead chief, who appears to the savage in dreams, is supposed to rule the winds and floods, and to visit with his wrath those who violate the rules of action established in the tribe.[2] When one of Mr. Darwin's companions, in Tierra del Fuego, shot some birds to preserve as specimens, a Fuegian present exclaimed, "O Mr. Bynoe, rain much, much wind, blow much!" thus indicating his belief that the wasting of food, condemned by tribal rules, would be visited with condign punishment by the tutelar deities of the tribe. "This transfigured form of restraint," says Mr. Spencer, "differing at first but little from the original form, is capable of immense development." As the fetishistic agencies are generalized into the deities of polytheism, and these in time are summed up in a single anthropomorphic deity, there slowly grows up the theory of a hell in which actions condemned by the community will be punished. The complex

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[1] Darwin, *Descent of Man*, vol. i. p. 87.

[2] See *Myths and Myth-Makers*, pp. 75, 237.

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horrible cruelty of tying his enemy to a tree and slowly burning him to death with firebrands. To the Indians described by Mr. Parkman, such villany formed the most delightful of recreations.

Thus, though the savage has the germ of a moral sense, which prompts him, irrespective of utilitarian considerations, to postpone his personal welfare to that of his clan, he can by no means be accredited with a fully developed moral sense. And the incentives which influence him are not what we call moral sentiments, in the strict sense of the phrase. "They are simply sentiments that precede and make possible those highest sentiments which do not refer either to personal benefits or evils to be expected from men, or to more remote rewards and punishments." The lower incentives have indeed continued to exert a powerful, perhaps a predominating, influence down to the present time. So long as readers are found for ethical treatises, like that of Jonathan Dymond, in which the sole ground of moral obligation is held to be the supernaturally revealed fiat of an anthropomorphic Deity; "while sermons set forth the torments of the damned and the joys of the blessed as the chief deterrents and incentives, and while we have prepared for us printed instructions 'how to make the best of both worlds'; it cannot be denied that the feelings which impel and restrain men are still largely composed of elements like those operative on the savage,—the dread, partly vague, partly specific, associated with the idea of reprobation, human and divine, and the sense of satisfaction, partly vague, partly specific, associated with the idea of approbation, human and divine."[1] But a sound ethical philosophy regards it as degrading to perform good actions or to refrain from performing bad actions merely in order to win applause or to secure a place in heaven. Something more is needed to complete our account of the moral sense.

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[1] Spencer, *Principles of Psychology*, vol. ii. p. 602.

Nevertheless, the more perilous portions of the labyrinth have been traversed, I hope with safety, and we now need only one more clew to bring us to the light. We shall best realize the character of this additional element needed, if we consider for a moment the most general aspects of the two groups of feelings already described. While the feelings of which we first treated under the head of pleasures and pains are purely egoistic or self-regarding feelings, on the other hand the feelings which we have lately described as underlying and forming the groundwork of the moral sense in a state of sociality have been happily characterized by Mr. Spencer as "ego-altruistic" feelings. That is, they concern the happiness of the individual in so far as it depends upon the feelings with which his fellow-creatures regard him. The mixed feeling ordinarily known as generosity, for example, is often to a very large extent ego-altruistic. "The state of consciousness which accompanies performance of an act beneficial to another is usually mixed; and often the pleasure given is represented less vividly than are the recipient's feeling toward the giver and the approval of spectators. The sentiment of generosity proper is, however, unmixed in those cases where the benefaction is anonymous: provided, also, that there is no contemplation of a reward to be reaped hereafter. These conditions being fulfilled, the benefaction clearly implies a vivid representation of the pleasurable feelings (usually themselves representative) which the recipient will have."[1]

This vivid representation of the pleasurable or painful feelings experienced by others is sympathy; and the additional factor to be taken into the account, in order to complete the explanation of the moral sense, is the enormous expansion of sympathy which has been due to the continued integration of communities, and to the accompanying decrease of warlike or predatory activity. A word of passing comment only is needed for the cynical theory that sympathy is but an ethereally refined selfishness, and that when we relieve a fellow-creature in distress we do it only because it pains us to see him suffer. This is true; but when the pain occasioned by the sight of another's suffering, or by the idea of suffering and wrong when generalized and detached from the incidents of particular cases, becomes so strong as to determine our actions, then the chasm is entirely crossed which divides us psychically from the brutes. Between the Fiji, who keenly relishes the shrieks of his human victim, and Uncle Toby, who could not kill a fly and pitied even the Devil, the difference has come to be generic. And when this kind of self-pleasing is carried so far as to lead a man to risk his life in the effort to rescue a stranger, or perhaps even an enemy, from fire, or drowning, it is so widely removed from what we mean when we speak of selfishness as to be antithetical to it. We do not describe the workings of Shakespeare's genius as reflex actions, though all intelligence was originally reflex action. Neither are we justified in describing as selfish the actions which are dictated by sympathy, though all sympathy is in its origin a kind of self-pleasing.

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[1] Spencer, *Principles of Psychology*, vol. ii. p. 613.

As already shown in describing the chief characteristics of the evolution of society, the primary cause which has developed sympathy at the expense of the egoistic instincts has been the continued integration of communities, originally mere tribes or clans, into social aggregates of higher and higher orders of complexity. For by this long-continued process the opportunities for the exercise of the altruistic feelings have been necessarily increased in number and frequency of occurrence, while the occasions requiring the exercise of the anti-social feelings have become less frequent, so that the former set of feelings have become strengthened by use, while the latter have become relatively weakened by disuse. Along with this direct and obvious effect of social integration, another effect has been wrought, indirect and been obvious. A high development of sympathy cannot be secured without a high development of representativeness, so closely inter-related are our intellectual and moral natures. A very feeble faculty of imagining objects and relations not present to sense must necessitate an absence of active sympathetic emotion, save in its crudest form. It is a familiar fact that many men are cruel, in word or deed, because they are incapable of adequately representing to themselves the pain, physical or mental, of which they are the cause. The validity of such an interpretation is confirmed by the fact that even where there is very high representative capacity, the lack of the requisite elements of personal experience will prevent the rise of sympathetic feeling. Thus it is notoriously difficult for strong and healthy people to enter into the feelings of those who are weak and nervous. These facts show that the development of sympathy is largely determined by the development of the representative faculty and [illegible] wealth and variety of experience. With the [illegible] form of sympathy, such as the painful thrill felt [illegible] one in a dangerous position, contrast such a [illegible] the sense of injustice, and it becomes [illegible] feeling differs from the former mainly [illegible] of representativeness. In the former [illegible] of the injury or death im- [illegible] immediately in sight; and it is [illegible] to the fulness of life of [illegible] the sympathetic feeling. In [illegible] example the kind of injustice [illegible] which English-speaking people [illegible] *habeas corpus* acts—there is the [illegible] that highly representative egoistic sentiment known as the love of personal freedom. At first a mere recalcitration against whatever impedes the free action of the limbs, this egoistic [illegible] has, through increased power of represe[illegible] a dislike and dread of whatever possible combination of circumstances may in any way, however remotely, interfere with the fullest legitimate exercise of all the functions of physical and psychical life. To have this complex feeling sympathetically excited for persons whom one has never seen, and who are perhaps yet unborn,—and still more, to be so far possessed by this highly generalized and impersonal sympathy as to risk one's own liberty and life in efforts to avert the possible evils which are the objects of its dread,—implies a power of representing absent relations such as has yet been acquired by only two or three of the most highly gifted families of mankind. And manifestly the sentiments which respond to the notions of justice and injustice in the abstract, are still more remotely representative, still more highly generalized, and still more thoroughly disengaged from the consideration of concrete instances of pleasure and pain.

To this expansion of the power of sympathetically representing feelings detached from the incidents of particular cases, until the sphere of its exercise has become even wider than the human race, and includes all sentient existence, is due our instinctive abhorrence of actions which the organically registered experience of mankind has associated with pain and evil, and our instinctive approval of actions similarly associated with pleasure and increased fulness of life. It is not that, as in intellectual progress, there has been a registration of inferences, at first conscious, but finally automatic; but it is that there has been a registration of feelings respectively awakened by pleasure-giving and pain-giving actions. And just as men's intellectual conceptions of the causes of phenomena become more and more impersonal as they are extended over wider and wider groups of phenomena, generating at last an abstract conception of Universal Cause, so free from the element of personality that to less cultivated minds it seems atheistic; so in like manner, as [illegible]pathetic feelings are extended over wider and wider [illegible] of present pains and [illegible] generate at last an abstract [illegible] the element of personality [illegible] unintelligible. The savage cannot understand the [illegible] which he sees among Europeans, and [illegible] ascribed by him to imbecility [illegible] personal end seems necessary as an [illegible] the philanthropist finds an adequate [illegible] contemplation of injustice in the abstract.

Thus the ethical theories, as well as the psychology, of the schools of Hume and Kant appear to be reconciled in the deeper synthesis rendered possible by the theory of evolution. On the one hand, it is a corollary from the laws of life that actions desired by the individual and approved by the community must in the long run be those which tend to heighten the life respectively of the individual and of the community. And on the other hand, it is equally true that there is a highly complex feeling, the product of a slow emotional evolution, which prompts us to certain lines of conduct irrespective of any conscious estimate of pleasures or pains. In no department of inquiry is the truth and grandeur of the Doctrine of Evolution more magnificently illustrated than in the province of ethics.

Before we conclude there are one or two further points to which it seems necessary to allude. In asserting that we possess an instinctive and inherited moral sense, it is not meant that we possess, anterior to education and experience, an organic preference for certain particular good actions, and an organic repugnance to certain particular bad actions. We do not inherit a horror of stealing, any more than the Hindu inherits the horror of killing cattle. We simply inherit a feeling which leads us, when we are told that stealing is wrong, to shun it, without needing to be taught that it is detrimental to society. Hence there is a chance for pathological disturbances in the relations between the moral sense and the actions with which it is concerned. Imperfectly adjusted moral codes arise, and false principles of action gain temporary currency. These, nevertheless, come ultimately to outrage our sympathies, and are consequently overthrown; while the principles of action which really tend to heighten the life of society are sustained by our sympathies ever more and more forcibly, and at last become invested with a sacredness which is denied to the others. Hence arises the ethical distinction between *mala prohibita* and *mala in se.*

Finally, it is not to be denied that, when the intelligence is very high, there is likely to arise a deliberate pursuit of moral excellence, attended by a distinct knowledge of the elements in which such excellence consists. Instead of being primeval, as the cruder utilitarianism seems to have imagined, such conscious devotion to ends conducive to the happiness of society is the latest and highest product of social evolution, and becomes possible only when the moral sense is extremely developed. At this stage, ethical conceptions begin to be reflected back upon the conduct of the individual where it concerns solely or chiefly himself; and the self-regarding virtues, as Mr. Darwin calls them, which are quite unknown save in a high state of civilization, come into existence. The injury of one's self, by evil thoughts, intemperate behaviour, or indulgence of appetite, comes to be regarded as not only physically injurious, but morally wrong; and there arises the opinion that it is selfish and wicked for one to neglect one's own health or culture. Here we approach the limits at which morality shades off into religion. For, as I shall hereafter show,[1] Religion views the individual in his relations to the Infinite Power manifested in a universe of causally connected phenomena, as Morality views him in relation to his fellow-creatures. To violate the decrees of Nature comes to be considered a sin, capable of awakening keen remorse; for to him whose mental habits have been nurtured by scientific studies, the principles of action prescribed by the need for harmonizing inner with outer relations are, in the truest sense, the decrees of God.

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[1] See below, part iii. chap. v.

And now, having reached the terminus of our inquiry, let us look back over the course for a moment, that we may see the character of the progress we have achieved. Such a retrospect is here especially needed, because the complexity of our subject has been so great, and the range of our illustrations so wide, that the cardinal points in our argument have perhaps run some risk of getting overlaid and concealed from view, and in particular it may not be sufficiently obvious how completely we have attained the object set before us as the goal of the present chapter and its predecessor, namely, to explain the genesis of the psychical forces which wrought the decisive change from animality to humanity. That we may well appreciate the solid consistency of the entire argument concerning the Genesis of Man, let us therefore contemplate in a single view its various factors.

We have seen that the progress from brute to man has been but slightly characterized by change in general bodily structure in comparison with the enormous change which has been wrought in the cerebrum, and in those highest psychical functions which stand in correlation with the condition of the cerebrum. We have seen that the development of these highest psychical functions, in all their wondrous variety and complexity, has consisted at bottom in the increase of the power of mentally representing objects and relations remote from sense. By the reiterated testimony of many diverse kinds of illustrative facts, we have been convinced that in mere quantity of representative capacity, with its infinitely various consequences, the civilized man surpasses the lowest savage by a far greater interval than that by which the lowest savage surpasses the highest ape; just as the gulf between the cerebral capacity of the Englishman and that of the non-Aryan dweller in Hindustan is six times greater than the gulf which similarly divides the non-Aryan Hindu from the gorilla. And we have indicated in sundry ways how this increase in representative capacity, itself a pre-requisite to any high degree of social combination, has been furthered by each advance in social combination, so that the enormous psychical progress achieved since mankind became distinctly human has been mainly dependent upon that increasing heterogeneity of experience which increasing social integration has supplied.

But in spite of the fact that the psychical progress achieved since mankind became distinctly human is so much greater in quantity than that which was required to carry it from apehood to manhood, we were led to adopt the Duke of Argyll's suggestion, that the boundary was really crossed when this preliminary and less conspicuous psychical progress had been achieved. And working out the happy thought which science owes to Mr. Wallace, we concluded that this comparatively inconspicuous but all-essential step in psychical progress was taken when the intelligence of the progenitors of mankind had reached the point where a slight increase in representative capacity came to be of greater utility to the species than any practicable variation in bodily structure. Here our first line of inquiry ended. So far as the mere subordination of physical to psychical modification is concerned, the character of the progress from apehood to manhood now became intelligible.

But at this point we were confronted with a new question, suggested by some of the conclusions obtained on our first line of inquiry. Having perceived that the intellectual progress, or increase in representative capacity, which distinguishes man from brute, is so intimately connected with man's capacity for social combination, it became needful

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so far as we can trace them out, recalling some of the conclusions reached in the chapter on the Evolution of Mind.

In an animal whose relations with its environment are very simple, resulting in an experience which is but slightly varied, the combinations of acts requisite for supporting life take place with a regularity and monotony approaching the monotonous regularity with which the functions of the viscera are performed. Hence the tendency to perform these actions is completely established at birth in each individual, just as the tendency of the viscera to perform their several functions is pre-established, all that is required in addition being simply the direct stimulus of outward physical opportunity. And the psychical life of such an animal we call purely instinctive or automatic. In such an animal the organized experience of the race counts for everything, the experience of the individual for nothing, save as contributing its mite towards the cumulated experience of the race. But in an animal whose relations with its environment are very complex, resulting in an experience which is necessarily varied to a considerable extent from generation to generation, the combinations of acts requisite for supporting life must occur severally with far less frequency than in the case of the lower animal just considered. Hence the tendency to perform any particular group of these actions will *not* be completely established at birth in each individual, like the tendency of the viscera to perform their several functions. On the other hand, there will be a multitude of conflicting tendencies, and it will be left for the circumstances subsequent to birth to determine which groups of tendencies shall be carried out into action. The psychical life of such an animal is no longer purely automatic or instinctive. A portion of its life is spent in giving direction to its future career, and in thus further modifying the inherited tendencies with which its offspring start in life. In such an animal the organized experience of the race counts for much, but the special experience of the individual counts for something in altering the future career of the race. Such an animal is capable of psychical progress, and such an animal must begin life not with matured faculties, but as an infant. Instead of a few actually realized capacities, it starts with a host of potential capacities, of which the play of circumstance must determine what ones shall be realizable.

Manifestly, therefore, the very state of things which made psychical variation more advantageous to the progenitors of mankind than physical variation, this very state of things simultaneously conspired to enhance the progressiveness of primeval man and to prolong the period of his infancy, until the plastic or malleable part of his life came to extend over several years, instead of terminating in rigidity in the course of four or five months, as with the orang-outang. Upon the consequences of this state of things, in gradually bringing about that capacity for progress which distinguishes man from all lower animals, I need not further enlarge. What we have here especially to note, amid the entanglement of all these causes conspiring to educe humanity from animality, is the fact, illustrated above, that this prolongation of infancy was manifestly the circumstance which knit those permanent relationships, giving rise to reciprocal necessities of behaviour, which distinguish the rudest imaginable family group of men from the highest imaginable association of gregarious non-human primates.

In this line of inquiry, which, so far as I know, has never yet been noticed by any of the able writers who have dealt with the origin of the human race, it seems to me that we have the clew to the solution of the entire problem. In this new suggestion as to the causes and the effects of the prolonged infancy of man, I believe we have a suggestion as fruitful as the one which we owe to Mr. Wallace. And the most beautiful and striking feature in this treatment of the problem is the way in which tions made agree in helping us to the solution. That same increase in representativeness, which is at the bottom of intellectual progressiveness, is also at the bottom of sociality, since it necessitates that prolongation of infancy to which the genesis of sociality, as distinguished from mere gregariousness, must look for its explanation. In this phenomenon of the prolonging of the period of infancy we find the bond of connection between the problems which occupy such thinkers as Mr. Wallace and those which occupy such thinkers as Sir Henry Maine. We bridge the gulf which seems, on a superficial view, for ever to divide the human from the brute world. And not least, in the grand result, is the profound meaning which is given to the phenomena of helpless babyhood. From of old we have heard the monition, "Except ye be as babes, ye cannot enter the kingdom of heaven." The latest science now shows us—though in a very different sense of the words—that, unless we had been as babes, the ethical phenomena which give all its significance to the phrase "kingdom of heaven" would have been non-existent for us. Without the circumstances of infancy we might have become formidable among animals through sheer force of sharp-wittedness. But, except for these circumstances, we should never have comprehended the meaning of such phrases as "self-sacrifice" or "devotion." The phenomena of social life would have been omitted from the history of the world, and with them the phenomena of ethics and of religion.

PART III.

COROLLARIES.

"Was wär' ein Gott der nur von aussen stiesse,
Im Kreis das All am Finger laufen liesse!
Ihm ziemt's die Welt im Innern zu bewegen,
Natur in Sich, Sich in Natur zu hegen;
So dass was in Ihm lebt und webt und ist
Nie seine Kraft, nie seinen Geist vermisst."
GOETHE.

"For my thoughts are not your thoughts, neither are your ways my ways, saith the Lord. For as the heavens are higher than the earth, so are my ways higher than your ways, and my thoughts than your thoughts."—ISAIAH.

CHAPTER I.

THE QUESTION RESTATED.

A SYNTHESIS of scientific doctrines has now been fairly constructed, in accordance with the plan laid out in the eleventh chapter of our Prolegomena. We have passed in review the sciences which deal with the various orders of phenomena that make up the knowable universe, and we have contemplated the widest truths which these sciences severally reveal, as corollaries of an ultimate truth. Before proceeding to expound our Cosmic Philosophy in its final results, let us briefly sum up the leading conclusions at which we have arrived.

It has been proved to follow from that axiom of the Persistence of Force upon which all physical science is based, that the mere coexistence of innumerable discrete bodies in the universe, exerting attractive and repulsive forces upon each other, necessitates a perpetual rhythmical redistribution of the Matter and Motion of which the phenomenal universe is composed. It has been proved that this eternal rhythm must of necessity be manifested in alternating eras both general and local, of Evolution and Dissolution,— eras in which now the concentration of Matter and dissipation of Motion, and now the diffusion of Matter and absorption of Motion, predominate,—eras which may be short, as in the duration of a process, consisting in a series of adjustments between the organism and its environment; and that Mind, objectively considered, is a special form of Life, consisting in a specialized portion of the series of adjustments. In these wondrous processes we have found the Law of Evolution most beautifully exemplified; the degree of Life, or of Mind, being high in proportion not only to the extent which the adjustments cover, but also to their complexity, definiteness, and coherence. That superadded process known as Civilization or social progress, has also been shown to consist in a series of adjustments between the community and its environment, in the course of which society becomes ever more and more complex and more interdependent in its various elements. That moral sense which underlies social progress and renders it possible, has been exhibited as the noble product of the slow organization of those feelings of pleasure and pain which, in highly-developed organisms, are mainly concerned in enhancing the perfectness of the adjustments in which Life consists. And finally we have witnessed the wonderful complication of cooperating processes by which Humanity—the crown and glory of the universe as we know it—has been evolved from a lower type of animal life, in entire conformity to the general law. The direct and relatively-simple processes of physical adjustment became at length almost wholly subordinated to the indirect and relatively-complex processes of psychical adjustment, so that variations in intelligence came to be selected in preference to variations in physique; the increased complexity of psychical adjustments entailed the lengthening of the period required for organizing them; the lengthening of infancy, thus entailed, brought about the segregation, into permanent family-groups, of individuals associated for the performance of sexual and parental functions; the maintenance of such family-groups involved the setting up of permanent reciprocal necessities of behaviour among the members of the group;

in this way the ultimate test of right and wrong
to be the welfare of the community, instead of th
the individual: the long process of social evo
inaugurated, has all along reacted upon individu
by increasing the power of mental represen
nourishing sympathy at the expense of egoism
through one and the same endlessly complicate
causes, has arisen the historic Man, with his I
his Moral Sense. Yet endlessly complicated as
has been, we see that it is throughout definable as
substitution of adjustments that are relatively-ind
geneous, and highly organized, for adjustmen
relatively-direct, homogeneous, and slightly orga

Thus we have fulfilled all the requirements l
the concluding chapter of our Prolegomena. We
a hypothesis which is based upon properties of
principles of dynamics that have previously been
which appeals to no unknown agency and inv
known attribute of matter or motion; and wh
ingly, contains no unverifiable element. This
has been successfully subjected to both deduct
ductive verification. In every department of n
triumphantly borne the supreme test of reconcili
of conceptions with the order of phenomena.
sociological chapters, as well as in the chap
Genesis of Man, it has enabled us to detect rela
phenomena which had hitherto remained in obsc

It remains to add that this grand hypothesis,
ception and elaboration of which I have ventu
Mr. Spencer to the thinker who conceived and
the hypothesis of gravitation, affords in itsel
illustration of that process of Ev[illegible]on which i
Considered as an event in int[illegible] develop
covery is an immense *extensio*[illegible] the
between the order of huma[illegible] a

phenomena, as Newton's discovery was an immense extension of the correspondence in space. The one has enabled us to adjust our mental sequences to phenomena as distant as the Milky Way; the other carries back the adjustments till they comprehend the birth of the Solar System. The announcement of a verifiable Law of Evolution is but the most recent phase of a process which has been going on from the time when men first began to speculate about the world of phenomena,—the process of substituting what may be called dynamical habits of thought for statical habits. Clearly the formation of a theory of the universe, whether as expressed in the crude mythologies of barbarians or in the elaborate systems of modern philosophers, is the establishment of a complex group of subjective relations that are either very imperfectly or much more completely adjusted to objective relations. All men now existing, whether civilized or savage, with the exception of idiots and very young children, possess some such theory, however vague and shadowy it may be. Such general statements as may be made by the most ignorant boor obviously imply some dim conception of the world and of his relations to it. Even the beliefs that the moon is about the size of a cheese, or that the devil has bewitched his cattle, are parts of a rudimentary kind of cosmic philosophy. Now among uneducated persons, alike in barbarous and in civilized countries, the crude philosophies current universally imply that the general arrangement of things is everywhere and in all ages substantially the same as it is witnessed by them in their immediate environment. Their theories are not adjusted to remote facts in time and space which only a thorough education could have added to their experience. They take what we may call a statical view of things. Hence they suppose that God created the world a few thousand years ago in nearly the same condition in which we now behold it; traditional observances, such as the keeping of a Sabbath, [illegible] like monogamy, and highly [illegible] such as monotheism, are [illegible] to the beginning of the world; [illegible] for granted that the thoughts [illegible] ages were like the thoughts and [illegible] own. Until within the last three [illegible] statical view of things was shared [illegible] cultivated people though with some- [illegible] narrowness. On the other hand [illegible] represented by the Doctrine of [illegible] the universe and all that is in [illegible] from epoch to epoch, obvi- [illegible] of our theories to longer [illegible] The progress of geologic [illegible] antiquity of the earth, was [illegible] began to arouse in educated [illegible] as continually though [illegible] Goethe and Lyell the [illegible] Lamarck and Cuvier, and [illegible] method to the historic [illegible] states of society, deep- [illegible] In no other respect [illegible] from past ages as [illegible] fundamentally. It is [illegible] and the art- [illegible] of M[illegible] [illegible] sciences of Mr. [illegible] chapter we shall [illegible] this great differ- [illegible] and nineteenth [illegible] political utopias of [illegible] encyclopaedists to over- [illegible] to bear in [illegible] meaning of [illegible] horizon [illegible] of criticizing sympathetically the relatively rude theories, customs, and prejudices of bygone generations; this ability to realize in imagination a time when forms of life now wholly distinct were represented by a common ancestral type, or a time when the material universe existed in a shape very different from that in which it is presented to our senses; this growing tendency to interpret groups of phenomena by reference to other groups of phenomena long preceding; are all alike explicable, in an ultimate analysis, as a prodigious extension in time of the correspondence between the human mind and its environment.

The Doctrine of Evolution, in which this dynamical habit of viewing things is reduced to a system, represents also the most extensive integration of correspondences that has yet been achieved. The continuous organization of scientific truths by philosophy has all along been a progress in this kind of integration. From the very first crude observations and the earliest cosmical theories, it is true that succeeding observations have all along had their results incorporated with the cosmical theories, or else new cosmical theories have been framed, which, by including the results of more mature observation, have superseded the old ones. In this way the progress of philosophy has on the whole kept pace with that of science. But between the earlier systems and the more modern ones there is a marked difference in the extent to which special truths in different departments of science are made to support and illustrate each other. For the gaps in the scientific knowledge synthesized in older systems were so considerable that, in order to make a synthesis at all, it was necessary to incorporate a large amount of hypothetical speculation which was not only unverified but unverifiable; so that the relations between science and philosophy were much less coherent than at present. To-day the interdependence is more complete than ever before. Our cosmic theories are rapidly modified by the incorporation of the results of countless new observations in all departments of science and philosophy, refraining more and more from ontological speculations, is becoming more and more thoroughly identified with cosmology. It is recognizing more and more fully that its proper business is to oversee and coordinate those seemingly separate groups of scientific truths which scientific specialists have not the leisure, and often neither the desire nor the ability, to coordinate. And obviously the philosophy most completely organized after this manner constitutes the most complete integration of correspondences between the order of conceptions and the order of phenomena. It constitutes an integral body of knowledge, the various members of which are at once more distinctly demarcated from each other and more intimately dependent upon each other than in any previous system.

Thus, in accordance with the expectation held out in an earlier chapter,[1] we find that 'from the earliest traceable cosmical changes down to the latest products of civilization,' there has been going on, and is going on, a ceaseless process of change, of which the main features are simple enough to be clearly deducible from the known physical properties of the universe, but of which the stupendous grandeur is such as to baffle the most strenuous efforts alike of reason and of imagination to follow it out in all its minuter details. Thus, too, we find ourselves amply rewarded for the hope with which we set out upon our inquiry,—namely, that in henceforth abandoning vain ontological speculation we were by no means about to dethrone Philosophy, but were on the point of winning for it even a goodlier realm than that which metaphysics had assigned to it. For in comparison with the sublime synthesis of truths which the foregoing chapters have but unworthily interpreted, all previous philosophic speculation seems fragmentary, crude, and unsatisfying. To no other theory of things yet devised by the wit of man can we so well apply the enthusiastic exclamation of Giordano Bruno:—"Con questa filosofia l'anima mi s' aggrandisce, e mi si magnifica l'intelletto."

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[1] See above, vol. i. p. 11

But while one part of our task has thus been fairly accomplished, another and equally important part still remains to be disposed of. Questions have from time to time been implicitly suggested, to which provisional answers must be given before our Cosmic Philosophy can be regarded as satisfactorily expounded, even in outline. That great Doctrine, for the establishing of which all departments of human knowledge have been laid under contribution, and which in turn is fast remodelling human thinking on all subjects whatever, has relations of the closest sort with religious philosophy. Sundry theological questions raised in the course of our Prolegomena must now be considered in the light of the general principles with which our survey of universal evolution has furnished us. Questions concerning God and the Soul, which the Positive Philosophy simply set aside as unworthy the attention of scientific thinkers, nevertheless cannot be ignored by any philosophy which seeks to bring about a harmony between human knowledge and human aspirations; and though we may confess ourselves unable to settle such questions, as scientific questions are settled, we may yet go as far as is possible without deserting the objective method, and indicate the position which we occupy with reference to them. We have already, in the earlier part of this work, been brought to the conclusion that the phenomenal universe is the manifestation of a Divine Power that cannot be identified with the totality of phenomena:[1] we have now to unfold, somewhat more fully, what is meant by this theistic conclusion. We have, at every fitting opportunity, declared that the phenomena of Mind can in nowise be explained as movements of Matter,[1] while at the same time a law of evolution, expressed in terms of matter and motion, is found to include the order of sequence of psychical phenomena: we must now attempt to clear away the difficulties which, to many minds, no doubt cluster around the seeming paradox. We have also hinted that beside the sphere to be assigned to Morality, there is a wider sphere to be assigned to Religion:[2] it behoves us now to show what are the general functions of religion, in accordance with our fundamental view of Life as an adjustment between inner and outer relations. And after having done what we can to elucidate these points, we must conclude by describing the critical attitude which our Cosmic Philosophy occupies with reference to other systems of belief and other principles of action.

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[1] This is implied in the statements in vol. i. p. 88, and also in the chapter on "Anthropomorphism and Cosmism." See also vol. i. p. 188.

The central problem, which must first occupy us, and the decision of which will affect the treatment of all the others, is the problem of Theism. What kind of theism is it which is compatible with the conclusions reached in the second part of this work concerning the past and present states of the universe? In discussing this question we shall presently find that the phase of theism which has until quite recently been the current phase, and which is still the phase officially defended by theologians, does not appear to be compatible with the conclusions referred to. As in treating of the preliminary evidence for the evolution of the higher forms of life from lower forms, we found ourselves at every step arrayed in opposition to the doctrine of special creations bequeathed to us by ancient mythology, so now upon this wider ground we shall have to note that the Doctrine of Evolution is throughout irreconcilably opposed to the Doctrine of Creation, so that the establishment of the former is in fact synonymous with the overthrow and destruction of the latter. In coming to regard the universe as evolved in accordance with discernible physical laws, working throughout a lapse of time to which human thinking can assign neither a beginning nor an end, we cease to regard it as created at any given point of time in accordance with a preconceived plan remotely analogous to the plans by which finite intelligence adapts means to ends. It is not, as we shall see in a moment, that the one conception metaphysically refutes the other, but that it practically supersedes it, and enables philosophy to dispense with it. While upon the time-honoured statical view of things, any given group of phenomena was explained by a reference to the direct creative action of a divine Power extraneous to the Cosmos; on the other hand, upon the modern dynamical view of things, any given group of phenomena is explained by a reference to some antecedent group of phenomena, while all phenomena alike are regarded as the sensible manifestations of a divine Power immanent in the Cosmos. It becomes desirable, therefore, to inquire whether on the new view there is any ground for assuming, as was necessarily assumed on the old view, that the divine Power works by methods analogous to human methods. The question which we have to answer is not whether there exists a God. As was clearly shown in the first part of this work, and as will presently be still more emphatically reiterated, our Cosmic Philosophy is based upon the affirmation of God's existence, and not upon the denial of it, like irreligious Atheism, or upon the ignoring of it, like non-religious Positivism. The question which we have now to answer concerns the existence of a limited personal God, who is possessed of a quasi-human consciousness, from whose quasi-human volitions have originated the laws of nature, and to whose quasi-human contrivance are due the manifold harmonies observed in the universe. Is this most refined and subtilized remnant

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[1] See vol. i. pp. 270, 412; vol. ii. pp. 80, 162.
[2] See above, p. 357.

[illegible] anthropomorphism to be retained by our Cosmic Philosophy, or is it to be rejected? And if it is to be rejected, what are the grounds which justify us in rejecting it?

Let it be said, in entering the question, that we are now in a region of thought where absolute demonstration, in the scientific sense, is impossible. I believe it is beyond the power of science to prove that the divine Power immanent in the Cosmos either does or does not work by anthropomorphic methods. We cannot expect, therefore, to obtain a result which, like a mathematical theorem, shall stand firm through mere weight of logic, or which, like a theorem in physics, can be subjected to a crucial test. We can only examine the arguments upon which the anthropomorphic hypothesis is founded, and inquire whether they are of such a character as to be convincing or satisfactory to thinkers who rigidly adhere to the Doctrine of Evolution, who assert the relativity of knowledge, and who refuse to reason upon the subjective method. If then it turns out that these arguments are not thus satisfactory, it will follow that, as the Doctrine of Evolution becomes more and more widely understood and accepted, the anthropomorphic hypothesis will generally fall into discredit, not because it will have been disproved, but because there will be no sufficient warrant for maintaining it. Or—to restate the case—if the hypothesis which represents God as working after quasi-human methods be found harmonious with the scientific truths upon which our Cosmic Philosophy rests, it may survive the complete establishment of that philosophy; but if otherwise, it will perish, as other doctrines have perished, through lack of the mental predisposition to accept it. It is, indeed, generally true that theories concerning the supernatural perish, not from extraneous violence, but from inanition.[1] The belief in witchcraft, or the physical intervention of the Devil in human affairs, is now laughed at; yet two centuries have hardly elapsed since it was held by learned and sensible men, as an essential part of Christianity. It was supported by an immense amount of testimony, which no one has ever refuted in detail. No one, for example, has ever disproved witchcraft, as Young disproved the corpuscular theory of light. But the belief has died out because scientific cultivation has rendered the mental soil unfit for it. The contemporaries of Bodin were so thoroughly predisposed by their general theory of things to believe in the continual intervention of the Devil, that it needed but the slightest evidence to make them credit any particular act of intervention. But to the educated man of to-day such intervention seems too improbable to be admitted on any amount of testimony. The hypothesis of diabolic interference is simply ruled out; and will remain ruled out. So with what is called "spiritualism," or the belief in the physical intervention of the souls of the dead in human affairs. Men of science decline to waste their time in arguing against it, because they know that the only way in which to destroy it is to educate people in science. "Spiritualism" is simply one of the weeds which spring up in minds uncultivated by science. There is little use in merely pulling up one form of the superstition by the roots, for another form, equally noxious, is sure to take root: the only way of ensuring the destruction of the pests is to sow the seeds of scientific truth. When, therefore, we are gravely told what persons of undoubted veracity have seen, we are affected about as much as if a friend should come in and assure us, upon his honour as a gentleman, that heat is not a mode of motion. The case is the same with the belief in miracles, or the physical intervention of the Deity in human affairs. To the theologian such intervention is *à priori* so probable that he needs but slight historic testimony to make him believe in it. To the scientific thinker it is *à priori* so improbable that no amount of historic testimony, such as can be produced, suffices to make him entertain the hypothesis for an instant. Hence it is that such critics as Strauss and Renan, to the great disgust of theologians, always assume, prior to argument, that miraculous narratives are legendary. Hence it is that when the slowly dying belief in miracles finally perishes, it will not be because any one will ever have refuted it by an array of syllogisms: the syllogisms of the theologian and those of the thinker trained in science have no convincing power as against each other, because neither accepts the major premise of the other: but it will be because the belief is discordant with the mental habits induced by the general study of science. Hence it is that the scientific philosopher is averse to proselytism, and has no sympathy with radical infidelity. For he knows that theological habits of thought are relatively useful, while scepticism, if permanent, is intellectually and morally pernicious. Knowing this, he knows that the only way to destroy theological habits of thought without detriment, is to nurture scientific habits,—which stifle the former, as surely as clover stifles weeds.

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[1] "Ce n'est pas d'un raisonnement, mais de tout l'ensemble des sciences modernes que sort cet immense résultat—il n'y a pas de surnaturel."—Renan, *Études d'Histoire Religieuse*, p. 206.

The belief that God works after quasi-human methods is akin to those just cited, in being incapable of proof or disproof by mere syllogism. Our business is only to determine whether the arguments in favour of it are calculated to convince those who insist upon the relativity of all knowledge, and whether the belief itself can be made to harmonize with the scientific truths upon which our Cosmic Philosophy is based. Let us begin by examining the doctrine of final causes, as defended by metaphysical arguments; and let us afterwards observe how this famous argument from design is affected by the theory of evolution.

CHAPTER II.

ANTHROPOMORPHIC THEISM.

THOUGH the mediæval conception of an arbitrary Providence, overruling natural laws and occasionally setting them aside, influenced by human petitions to bring about special results by extraordinary means, and singling out nations or individuals as the objects of its favour or displeasure, has been partially abandoned for a more refined conception of theism, in which the Deity is represented as working through natural laws; yet the survival of the doctrine of final causes shows that a strong element of anthropomorphism is retained even in the latter conception. The doctrine of final causes ultimately reposes on the assumption that God entertains intentions and purposes closely resembling in kind, though greatly excelling in degree of sagacity, the purposes and intentions of man. In accordance with this view, we are told that it will not do to content ourselves with the discovery of Law, but that we must also look about for indications of Purpose; since Law is not, relatively to our human understanding, an ultimate fact, but may be recognized by us as the expression of the will of a Lawgiver. Everything that exists—it is said—has been created to subserve some design, and as a means to the accomplishment of some end; and the detection of this end, the penetration of this design

[illegible] scientific study of the universe.
[illegible] into the divine
[illegible] structure of the eyes and the
[illegible] but we shall also find it
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[illegible] ascertained the creative
[illegible] equivalents.[2] Not
[illegible] many facts which would
[illegible] impenetrable dark-
[illegible] anthropomorphic
[illegible] of things is said to
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[illegible] such brilliant hopes may
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[illegible] But if this cannot be
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[illegible] indiscriminate
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[illegible] loyalty to
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[illegible] sort of justifica-
[illegible] which are
[illegible] loyal to Truth

[illegible] fail to
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[illegible] investigated
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will never harbour the misgiving that her paths may lead to Hades: he will fearlessly follow the guidance of Science, never doubting that consolation must come of knowing the truth. In the present case we shall find reason to conclude that the hypothesis of a quasi-human God is likely to aggravate rather than to relieve the mental distress of scepticism.

The doctrine of final causes we may first contemplate, for a moment, under its logical aspect, and notice that, even if it were true, it could never have the value which is claimed for it as a means of investigation. Even admitting that all things have been created with forethought, and that the harmonious cooperation of phenomena is the fruit of contrivance, it is none the less undeniable that this forethought cannot be perceived, the threads of this contrivance cannot be unravelled by us, until the laws to which phenomena conform have already been discovered. Previous to Newton, for instance, all attempts to detect design in the structure of the solar system must have shared the fate of the quite different guesses of Descartes and others as to its physical conditions. Evidences of design, therefore, in order to be trustworthy, must be deduced from known laws, and cannot safely be employed as stepping-stones to the discovery of new truths. However plausible they may seem as corollaries, they can never be useful as lemmas or postulates. As M. Scherer well observes, God is the cause of all things, but the explanation of nothing.[1] Accordingly unless we are so arrogant as to lay claim to the possession of some direct

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[1] "Dieu, comme on l'a très-bien dit, est la cause de tout, mais il n'est explication de rien." Scherer, *Nouvelles Etudes sur la Littérature Contemporaine*, p. 408. See also Geoffroy Saint-Hilaire, *Anomalies de l'Organisation*, tom. iii. p. 608. The only objection which can be made to M. Scherer's statement is its disjunctive form. Obviously that which is the cause of everything *cannot* be the explanation of anything. We cannot explain any particular group of phenomena by a reference to divine action, because such a reference is merely a reference to the source of all phenomena alike, and hence cannot give us specific information concerning any particular group. Laplace was therefore quite justified in saying "Je n'ai pas besoin de cette hypothèse."

[illegible] purposes,[1] what is left for [illegible] the humbler means of [illegible] our disposal—with being [illegible] nature,' is the great master [illegible] majesty still!

[illegible] theory thus appear to be [illegible] but its claim to [illegible] Looking at [illegible] has been that of [illegible] habits of thought, [illegible] abandoned by the [illegible] From time to time, with [illegible] search for final causes [illegible] sciences, until it is now [illegible] and inferior branches of [illegible] observes, final causes [illegible] method for resolving [illegible] Dr. Whewell, the great [illegible] admits that [illegible] sciences, which [illegible] we knew enough [illegible] however, [illegible] limited [illegible] theology by the most advanced sciences augurs ill for its ultimate chances of survival in any field of inquiry. Previous to the researches of Kant and Laplace, such phenomena as the distribution of satellites and the inclinations of planetary axes were explained teleologically. These phenomena having been at last interpreted by a reference to universal laws of matter and motion, the teleological hypothesis took refuge in biology, where it held for a while a doubtful tenure, as a means of explaining the origination of specific forms of life. The discoveries of Mr. Darwin having gone far toward driving it from this stronghold, replacing the conception of miraculous interposition by the conception of natural selection, it is nevertheless still appealed to by such writers as Mr. Wallace and Mr. Mivart, as furnishing an explanation for sundry phenomena of organic evolution which natural selection, taken alone, seems at present incompetent to account for. In short, the teleological hypothesis derives its apparent confirmation never from the phenomena which were explained yesterday, but always from the phenomena which are awaiting an explanation to-morrow. "I give up phenomenon A," says the theologian, "for that you have explained in terms of matter and motion; but phenomenon B you can never so explain, and upon that I therefore rest my teleological hypothesis." To-morrow phenomenon B is interpreted in terms of matter and motion, and appeal is made to phenomenon C; and so on, to the end of the alphabet. Now the cosmic conception of Deity, as we shall hereafter see, being planted in the region of the Unknowable, which is coextensive with that of the Knowable, has no such precarious tenure, and all that the progress of discovery can do is to enlarge and strengthen it. But the anthropomorphic conception, lodged in that ever diminishing area of the Knowable which is to-day unknown, is driven from outpost to outpost, and robbed of some part of its jurisdiction by every advance of science. Surely that must be an unworthy conception of

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[1] [illegible]

[2] [illegible] does not [illegible] the [illegible] in the [illegible] that [illegible] similar [illegible] in the skull of [illegible] kangaroo, which is born when an inch in length, and in that of [illegible] low bird that breaks the brittle egg, we [illegible] the truth of Bacon's com[illegible] of final causes to the Vestal Virgins." [illegible] *The Nature of Limbs*, [illegible] Or, as Prof. Huxley very happily [illegible] "might be more fitly [illegible] the *hetaerae* of philosophy, so [illegible] they led men astray." [illegible] *Sermons*, p. 255.

Deity which is confessedly based on those limitations alone of finite phenomenal knowledge, which each day's experience proves more and more clearly to be but temporary. Surely the teleological hypothesis is built upon a rotten foundation, when it has to dread the shock of each advancing wave of knowledge. Surely it is no less irreverent than unphilosophical to rest our faith in God's existence upon the alleged impossibility of interpreting in terms of matter and motion the beginnings of life, the cross-relations between marsupials and monodelphia, or the structure of the ears and eyes of a cephalopod.

Further to develope this argument would be premature, in the absence of explanations to be given in the next chapter. Contenting ourselves for the present with this brief indication, let us now approach the subject somewhat more closely, and examine certain metaphysical arguments upon which it has lately been sought to base an elaborate teleological theory. The "Inquiry into the Theories of History," by Mr. William Adam, presents us with what is probably the last form of the attempt to carry on scientific research by theological methods, and two or three of its arguments may here be fitly noticed, as typical of the entire class to which they belong.

Mr. Adam accepts, with some qualifications, the doctrine of Descartes and Spinoza, that causes resemble their effects. He holds that physical, intellectual, and moral causes respectively resemble their physical, intellectual, and moral effects; and hence infers that the Deity, as a moral and intellectual cause, must resemble the effect Man — must therefore purpose, contrive, and exert volition. The conclusion would have more weight, were it not so manifestly begged in the premise. Next, even in this modified shape, the rule that causes resemble their effects is hampered by awkward exceptions, in dealing with which Mr. Adam has not been fortunate. Assuming, for example, that heat is the cause of steam, he maintains the likeness of the cause to its effect, on the ground that both are *in a state* of molecular agitation! The mental confusion which resulted in this extraordinary statement, is still more explicitly revealed in the assertion that "heat is like steam, as being both physical objects." So, then, we get some conception of the kind of science with which anthropomorphism is practically compatible. Heat, it seems, is a physical object in a state of molecular agitation!! The ordinary physicist will certainly object that heat, being the state of molecular agitation, can hardly be called, with propriety, the physical object. And the logician will add that, even if it could be so called, an argument would hardly be thought convincing which should rest upon the alleged resemblance of a billiard-table to a rhinoceros—yet these are both physical objects. Mr. Adam is equally unhappy in his answer to Mr. Mill's humorous criticism of Descartes. Parodying the celebrated maxim,—*Si enim ponamus aliquid in idea reperiri quod non fuerit in ejus causa, hoc igitur habet a nihilo,* Mr. Mill observes that "if there be pepper in the soup, there must be pepper in the cook who made it, since otherwise the pepper would be without a cause." Mr. Adam's reply savours strongly of mediæval realism. The cook, he says, is not indeed the efficient cause of the pepper, but the cook's *intelligence* is the efficient cause of the *intelligence* displayed in the mixture of the ingredients of the soup—so that even here the cause is like the effect! Comment is not needed. Human ingenuity is indeed pushed to the limit of its tether, when by a play upon words it tries to liken a physical combination of salt, pepper, and meat-juice to an intellectual coordination of experiences.

Apart from these ill-chosen and ill-managed examples, the Cartesian argument, as modified by Mr. Adam, appears to stand as follows:—When a physical event, such as the pulling of a trigger, is followed by another physical event, such as the firing of a pistol, the antecedent resembles the consequent, since both are physical events. When an intellectual event, such as the rising into consciousness of the idea of Hamlet, is followed by another intellectual event, such as the ideal representation of a crowded theatre, the antecedent resembles the consequent, since both are intellectual events. When a moral event, such as a fit of ungovernable passion, is followed by another moral event, such as a bitter sense of remorse, the antecedent is like the consequent, since both are moral events. Therefore the primal Cause, antecedent to the whole compound series of intellectual and moral events, must be intellectual and moral in its nature.

Underneath this whole argument there lies an ill-concealed *petitio principii.* Three parallel lines of causal sequence being set up, it is unwarrantably assumed that causal relations hold only between the successive members of each separate series, or in other words, that there are no causal relations between the members of one series and the members of another. A single instance of causal relation between a material event and an intellectual or emotional event—such as the relation between certain atmospheric undulations communicated from violin-strings to the auditory nerve, and the consequent recognition of the triad of A-minor, with the accompanying pleasurable feeling—is fatal to the argument. Waiving this objection, however, and for the moment admitting that the universe, as containing intellectual and moral phenomena, requires an intellectual and moral Cause; we may note that the argument proves altogether too much. Since the universe contains material, as well as psychical phenomena, its First Cause, according to Mr. Adam's argument, must partake of all the differential qualities of those phenomena. If it reasons and wills, like the higher animals, it must also, like minerals, plants, and the lowest animals, be unintelligent and unendowed with the power of volition,—

quires in the First Cause a more than Hegelian for uniting contradictory attributes. Else we must e its causal action to be confined to man, and those animals which manifest intelligence and volition, le the rest of the universe either seeks another First use, or goes without one. All these are alike conclusions hich philosophy cannot for a moment tolerate, and which are as shocking to science as to religion.

A still more fatal criticism remains to be made. Considered as a modification of the Cartesian doctrine, Mr. Adam's theory is entirely illegitimate: it is the product of a gross misconception of the Cartesian doctrine. All these causes and effects, so carefully but unskilfully compared by Mr. Adam, are *phenomenal* antecedents and consequents; and even supposing the universal resemblance of phenomenal causes to phenomenal effects to be fully made out, the anthropomorphic argument is not helped in the least. Until a *phenomenal* effect can be brought into juxtaposition and compared with its *noumenal* cause, the argument has no logical validity; but, because of the relativity of all knowledge, this can never be done. To call the First Cause a phenomenon is to make a statement that is self-contradictory; since phenomena exist only by virtue of their relation to human (or animal) consciousness. The First Cause being absolute and infinite, is a noumenon, and no amount of resemblance, alleged or proved, between various orders of its phenomenal effects, can bear witness to any resemblance between a phenomenal effect and the noumenal Cause. The phenomena of motion, for example, exist as phenomena only in so far as they are cognized; and the very constitution of the thinking process renders it impossible for us to assert similarity between the phenomenon and the thing in itself. Indeed a comparison between the various phenomena of motion gives us good ground for believing that there can be no such thing as resemblance between the phenomena and their phenomenal cause. At the beginning of this work it was shown that the objective reality underlying the phenomena of heat, light, motion, and molecular vibration, cannot be held to resemble one of these sets of phenomena more than another, and accordingly cannot be held to resemble any of them. And this conclusion, thus forced upon us by concrete examples, is the only one consistent with what we know of knowledge. Obviously the phenomenon cannot be held to be like the objective reality without ignoring the circumstance that the mind is itself a factor in the process of cognition. Now the Cartesians, with more regard for the exigencies of the case than is shown by Mr. Mivart, unflinchingly asserted that phenomenal effects are like noumenal causes,—that whatever is in the subjective conception is also in the objective reality. As a proposition in psychology, this is a denial of the relativity of knowledge. As a canon of logic, this is the quintessence of the subjective method. Hence, though the metaphysician and the theologian may adopt an anthropomorphic hypothesis founded upon such an argument, it is impossible for a scientific philosopher to do so.

The attempt to establish the anthropomorphic hypothesis by means of the volitional theory of causation is, from the scientific point of view, equally futile. From first to last, as was fully demonstrated in the chapter on Causation, the argument of the volitionists is made up of pure assumptions. From the unwarranted psychological postulate that Will is a noumenal or efficient cause of muscular action in animals, it proceeds, by a logical *non sequitur*, to the equally unwarranted conclusion that Will is the noumenal or efficient cause of all the dynamic phenomena of the universe, and must therefore be the First Cause. Volition being asserted to be the only source whence motion can originate, it is affirmed that, save on the hypothesis of a Supreme Will, the activity of nature baffles comprehension. The reply of the scientific critic is that, in an ultimate analysis, the activity of nature does, and must ever, baffle comprehension; and that, upon any hypothesis frameable by our intelligence, whether theistic or non-theistic, the origination of motion must remain not only incomprehensible but inconceivable. Relatively to our finite power of apprehension, motion is to be regarded, like matter, as eternal.[1] The unthinkableness of the creation or destruction of matter or motion is involved in the axiom that force is persistent, which is the fundamental axiom of all science and of Cosmic Philosophy. Whether motion, considered apart from our power of apprehension, ever had a beginning or not, is a question which cannot concern us as scientific thinkers. To assert that it had, is to put into words a hypothesis that cannot be translated into thought, and to assume Volition as its primal antecedent, is to frame an additional hypothesis that is essentially unverifiable. Phenomenally we know of Will only as the cause of certain limited and very peculiar kinds of activity displayed by the nerves and muscles of the higher animals. And to argue from this that all other kinds of activity are equally caused by Will, simply because the primal origination of motion is otherwise inexplicable, is as monstrous a stretch of assumption as can well be imagined. While to contend—as many have done—that because human volitions are attended by a sensation of effort, there is therefore effort in each case of causation, is much like identifying gravitative force with the sensation of weight by which the attempt to overcome it is always accompanied.[2]

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[1] Or—to state the same thing in another form—the possibilities of thought are limited by experience; and experience furnishes no data for enabling us to conceive a time, either past or future, when the Unknowable would be objectively manifested to consciousness otherwise than in movements of matter. But this, it should be remembered, applies solely to our powers of conception. Thought is not the measure of things, and where the region of experience is transcended, the test of inconceivability becomes inapplicable. See above, vol. i. p. 11.

[2] See above, vol. i. p. 157.

The last of the *à priori* arguments which it is necessary to notice in this connection, is that which infers the existence of an intelligent Lawgiver from the omnipresence of Law. "The proofs of necessary law and of an intelligent will . . . . remain undeniable," says Mr. Adam, "and no hardihood of assertion can annul them; and when an attempt is made to bring both into logical connection, the mind, not only without violence to its powers, but on the contrary with a clear perception of necessary congruity, believes that law must proceed from a lawgiver, beneficent laws from a moral ruler. To disjoin an intelligent will from necessary law is to shake our confidence in the perpetuity and salutary operation of law itself. The conception of law without will is that of agency without an agent: the conception of will without law is that of an agent without agency. Necessary law is the constant expression of the divine will." Upon this point Mr. Adam repeatedly insists in the course of his work,[1] asserting again and again that, without admitting "this great central conception of a Supreme Will," the laws of nature must for ever remain unintelligible. Let us not fail to note that Mr. Adam's conception of theism, as here illustrated, is far more refined, and far less hostile to scientific inquiry, than the conception of theism embodied in the accepted creeds of theologians, and officially defended from the pulpit. Those who adopt Mr. Adam's conception will, if consistent, welcome, instead of opposing, every scientific interpretation of phenomena hitherto deemed supernatural; since, in the above passage, God is clearly regarded as manifesting himself in order and not in disorder, in method and not in caprice, in law and not in miracle. With this view our Cosmic Philosophy thoroughly coincides; and, eliminating the anthropomorphism from Mr. Adam's statement, I, for one, will heartily join in the assertion that

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[1] Adam, *Theories of History*, pp. 92, 130, 180, 189, 209, 222, 281, 284, 404. The passage just cited is to be found on p. 192.

"necessary law is the constant expression of the divine *working*." But the connection asserted between universal law and a supreme quasi-human Will, is one which a scientific philosophy cannot admit, for it rests upon a mere verbal equivocation. The inference from community of name to community of nature, however appropriate it might have seemed to the realists of the twelfth century, is in our day hardly admissible. Because the word "law" is used to describe alike the generalizations of Kepler and the statutes enacted by a legislative body, we must not infer, with a *naïveté* worthy of the schoolmen, that whatever is true of the one will always be true of the other. That the laws of Justinian emanated from a lawgiver is no reason for believing the same to have been the case with the law of gravitation; for the former were edicts enjoining obedience, while the latter is but a generalized expression of the manner in which certain phenomena occur. A law of nature, as formulated in a scientific treatise, is a statement of facts, and nothing more. Expressed in the indicative mood, it has nothing whatever to do with the imperative. [illegible] tells us nothing of a celestial Ukase compelling the earth to gravitate toward the sun. We know that it does so gravitate with a certain intensity, and that is the whole story. [illegible] so strong is the realistic tendency [illegible] of name to [illegible] the most careful writers [illegible] to the original sense of the word [illegible] the expression of the will of a superior. [illegible] Indeed, it is immediately after defining a law as "a general name for certain movements of the same kind which regularly occur under the same circumstances," [illegible] Will which [illegible] [illegible] phenomena and [illegible] [illegible]. Upon [illegible] determination [illegible] [illegible]

[illegible]

Strip the phrase "law of nature" of this inherent ambiguity, substitute for it the equivalent phrase, "order of sequence among certain phenomena," and the anthropomorphic inference so confidently drawn from it at once disappears.

Viewed in close connection with the Doctrine of Evolution, this scholastic argument from the Law to the Lawgiver lands us amid strange and terrible embarrassments. For what is a law, in the sense in which the word is used by legislators? It is a set of relations established by the community, or by some superior mind representing and guiding the community, in correspondence with certain environing circumstances. Certain phenomena of crime, for example, tend to detract from the fulness of life of society, and to balance these phenomena a certain force of public opinion is embodied in an edict prescribing due punishments for the crimes in question. Or—slightly to vary the definition and make it more comprehensive—a law is the embodiment of a certain amount of psychical energy, directed towards the securing of the highest attainable fulness of social life. Now if, on the strength of an ambiguous terminology, we proceed to regard the "laws" of nature as edicts enjoined upon matter and motion by a personal Ruler, shall we also, as we are logically bound to do, carry with us the conceptions of legislation with which the Doctrine of Evolution has supplied us? Shall we say that the infinite Deity adjusts inner relations to external contingencies?

Here we come upon the brink of the abyss into which the anthropomorphic hypothesis must precipitate us, if instead of passively acquiescing in it as a vague authoritative formula, we analyze it with the scientific appliances at our command. To those who have acquired some mastery of the physical truths upon which our Cosmic Philosophy is based, the doctrine not only ceases to be intellectually consoling, but becomes a source of ungovernable disturbance. For to represent the Deity as a person who thinks, contrives, and legislates, is simply to represent him as a product of evolution. The definition of intelligence being "the continuous adjustment of specialized inner relations to specialized outer relations," it follows that to represent the Deity as intelligent is to surround Deity with an environment, and thus to destroy its infinity and its self-existence. The eternal Power whereof the web of phenomena is but the visible garment becomes degraded into a mere strand in the web of phenomena; and the Cosmos, in exchange for the loss of its infinite and inscrutable God, receives an anomalous sovereign of mythologic pedigree.

Nor can the theologian find a ready avenue of escape from these embarrassments in the assumption that there is such a thing as disembodied intelligence which is not definable as a correspondence between an organism and its environment, and which is therefore not a product of evolution. Experience does not afford the data for testing such a hypothesis, and to meet it with denial would accordingly be unphilosophic in the extreme. That there may be such a thing as disembodied or unembodied Spirit will be denied by no one, save by those shallow materialists who fancy that the possibilities of existence are measured by the narrow limitations of their petty knowledge. But such an admission can be of no use to the theologian in establishing his teleological hypothesis. For even granting the existence of such unembodied Spirit, the moment we ascribe to it intelligence we are using words to which experience has assigned definite meanings, and we are not at liberty to play fast and loose with these meanings. When we speak of "intelligence," we either mean nothing at all, or we mean that which we know as intelligence. But that which we know as intelligence implies a circumscribed and limited form of Being adapting its internal processes to other processes going on beyond its limits. Save as describing such a correspondence between circumscribed Being and its environment, the word "intelligence" has no meaning whatever, and to employ it is simply to defy logic and insult common-sense. In ascribing intelligence to unembodied Spirit, we are either using meaningless jargon, or we are implicitly surrounding unembodied Spirit with an environment of some kind, and are thus declaring it to be both limited and dependent. The assumption of disembodied intelligence, therefore leaves the fundamental difficulty quite untouched.

Thus in default of all tenable *à priori* support for the anthropomorphic hypothesis, it must be left to rest, if it is to be entertained at all, upon its ancient inductive basis. In spite of the difficulties encompassing the conception, we may fairly admit that if the structure of the universe presents unmistakeable evidences of divine contrivance or forethought, these evidences may be received in verification of the hypothesis which ascribes to God a quasi-human nature. And thus the possible establishment of that hypothesis must depend upon the weight accorded to the so-called "evidences of design."

From the dawn of philosophic discussion, Pagan and Christian, Trinitarian and Deist, have appealed with equal confidence to the harmony pervading nature as the surest foundation of their faith in an intelligent and beneficent Ruler of the universe. We meet with the argument in the familiar writings of Xenophon and Cicero, and it is forcibly and eloquently maintained by Voltaire as well as by Paley, and, with various modifications, by Agassiz as well as by the authors of the Bridgewater Treatises. One and all they challenge us to explain, on any other hypothesis than that of creative design, these manifold harmonies, these exquisite adaptations of means to ends, whereof the world is admitted to be full, and which are especially conspicuous among the phenomena of life. Until the establishment of the Doctrine of Evolution, the glove thus thrown, age after age, into the arena of philosophic controversy, was never triumphantly taken up. It was Mr. Darwin who first, by his discovery of natural selection, supplied the champions of science with the resistless weapon by which to vanquish, in this their chief stronghold, the champions of theology. And this is doubtless foremost among the causes of the intense hostility which all consistent theologians feel towards Mr. Darwin. This antagonism has been generated, not so much by the silly sentimentalism which regards the Darwinian theory as derogatory to human dignity; not so much by the knowledge that the theory is incompatible with that ancient Hebrew cosmogony which still fascinates the theological imagination; as by the perception, partly vague and partly definite, that in natural selection there has been assigned an adequate cause for the marvellous phenomena of adaptation, which had formerly been regarded as clear proofs of beneficent creative contrivance. It needs but to take into the account the other agencies in organic evolution besides the one so admirably illustrated by Mr. Darwin, it needs but to remember that life is essentially a process of equilibration, both direct and indirect, in order to be convinced that the Doctrine of Evolution has once for all deprived natural theology of the materials upon which until lately it subsisted.[1]

These apparent indications of creative forethought are just so many illustrations of the scientific theorem that life, whether physical or psychical, is the continuous adjustment of inner relations to outer relations. "On this fact," says Mr. Barratt, "depends the usual argument to prove the existence of God from design or final *causes*; the whole strength of which is produced by a mere verbal sleight of tongue—by calling an effect a cause. Any combination of laws would produce its own proper results: hence under any constitution of the universe, good or bad, possible or impossible, as it may seem to us, it would always be true that 'whatever is, is right.' To give an instance—the particular laws of our present universe bring about night, they also cause the phenomenon sleep in animated creatures: these two naturally suit each other, being different results of the same laws—just as any two propositions in Euclid agree together. But to say that either is the final cause of the other is to transfer an idea derived from one part of ourselves, our motives to action, to an entirely different part of ourselves, our primary laws of sensation. *The earth is suited to its inhabitants because it has produced them, and only such as suit it live.*"[1] This last statement, which I have italicized, is the triumphant answer with which science meets the challenge of natural theology. It is not that the environment has been adapted to the organism by an exercise of creative intelligence and beneficence, but it is that the organism is necessarily fitted to the environment because the fittest survive. In no way can the contrast between theology and science, between Anthropomorphism and Cosmism, be more clearly illustrated than in this antithesis. Let us now pursue the argument somewhat farther into detail, but slightly changing for a moment the point of view, in order that we may not only show the superiority of the scientific explanation, but may also show how the anthropomorphic theory finds its apparent justification. A theory may be shattered by refutation; but in order to demolish it utterly it must be accounted for. We shall see that from the very constitution of the human mind, and by reason of the process whereby intelligence has arisen, we are likely everywhere to meet with apparent results of creative forethought; and that thus

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[1] That Darwinism has given the death-blow to teleology is admitted by Schleiden,—an unwilling witness. See Büchner, *Die Darwinsche Theorie*, p. 159. Haeckel also says:—"Wir erblicken darin [in Darwin's discovery] den definitiven Tod aller teleologischen und vitalistischen Beurtheilung der Organismen." *Generelle Morphologie der Organismen*, tom. i. p. 160.

[1] *Physical Ethics*

in the evolution of intelligence itself these phenomena find their only satisfactory explanation.

In the chapter on the Evolution of Mind it was shown that the intelligence of any man consists, partly of inner relations adjusted from moment to moment in conformity with the outer relations present in his own environment, and partly of organized and integrated inner relations bequeathed him by countless generations of ancestors, brute and human, and adjusted to the outer relations constantly presented in innumerable ancestral environments. Throughout all time, therefore, since intelligence first appeared upon the earth, the world of conceptions has been maintained in more or less complete correspondence with the world of phenomena. Just as in the mental evolution of each individual there is preserved a certain degree of harmony with the mental evolution of contemporary and surrounding individuals, so the total evolution of intelligence has kept pace more or less evenly with the changes of the environment with which it has interacted. Sense after sense has assumed distinct existence in response to stimuli from without. One set of experiences after another has been coordinated in harmony with combinations existing without. Emotion after emotion has been slowly generated in conformity with the necessities entailed by outward circumstances. And thus the contemplating mind and the world of phenomena contemplated are, if I may so express it, tuned in mysterious unison.

Let us now inquire into the bearing of this fact upon the origin and apparent justification of the teleological theory. We have seen that man has from the earliest times been wont to project ideally his personality into the external world, assimilating the forces of physical nature to the forces displayed in his own volitions, and with unrestrained fancy multiplying likenesses of his own intelligence as means wh[illegible] render comprehensible the agencies ever at work ar[illegible]. Stronger in the ages of primeval fetishism that at any subsequent time, this aboriginal tendency is [illegible] overcome. Even as in the [illegible] stranger may be seen still [illegible] surviving [illegible] feelings organized in the race [illegible] time when the strange meant the dangerous, so likewise may [illegible] survivals of a fetichistic style of thinking [illegible] theories now [illegible] above [illegible]. The animistic mode of [illegible] was once universal [illegible] the most abstruse problems. It was at first [illegible] the simplest. Storm and sunshine as well as [illegible] were regarded as the manifestations of supernatural volition and [illegible] supernatural intelligences. For [illegible] steadily advancing in generalized [illegible] seemed isolated and [illegible] generalization in preserving [illegible] modern [illegible]

[illegible] phenomena. In

is the primitive fetishistic habit of thought, however modified by conflict with scientific habits, which furtively leads us to regard volition as supplying the nexus between cause and effect, and to interpret the harmonious correspondences in nature as results of creative contrivance and indications of creative purpose.

Such being the origin of the teleological hypothesis, its apparent warrant is to be sought in the facts above recounted with respect to the evolution of intelligence. It is the complex and organized correspondence of the mind with its environment, which seems to furnish inductive justification to the thinker who is predisposed to see in nature the workings of a mind like his own. Arranging and combining various experiences received from without, adjusting new inner relations to outer relations established from time immemorial, man reacts upon the environment, and calls into being new aggregations of matter, new channels of motion, new reservoirs of energy. He does not perceive and reflect only—he also contrives and invents. As often as he builds an engine, launches a ship, paints a picture, moulds a statue, or composes a symphony, he creates in the environment new relations tallying with those present within himself. And then, by a natural but deceptive analogy, he infers that what has taken place in the tiny portion of the universe which owns himself as its designer, must also have taken place throughout the whole. All the relations externally existing, he interprets as consequent upon primordial relations shaped in a mind similar to his own. By a subtle realism, he projects the idea of himself out upon the field of phenomena, and deals with it henceforth as an objective reality. Human intelligence made the watch, therefore superhuman intelligence made the flower. Human volitions bring to pass wars and revolutions, divine volitions therefore cause famine and pestilence. So when, in the pervading unity which amid endless variety of detail binds into a synthetic whole the classes and genera of the organic world, an earnest and reverent thinker, like Agassiz, beholds the work of omnipresent thought, he is but unawares contemplating his own personality reflected before him, and mistaking, Narcissus-like, a mirrored image for a substantial object of adoration. Thus is explained, even while it is refuted, the famous argument of the watch, with all its numerous kindred. In the anthropomorphic hypothesis, the bearings of the inner and the outer worlds are exactly reversed. It is not the intelligence which has made the environment, but it is the environment which has moulded the intelligence. In the mint of nature, the coin Mind has been stamped; and theology, perceiving the likeness of the die to its impression, has unwittingly inverted the causal relation of the two, making Mind, archetypal and self-existent, to be the die.

Therefore, to cite the language employed with slightly different but kindred intent by Mr. Barratt, "we protest against the reversal of the true order. . . . We must not fall down and worship as the source of our life and virtue the image which our own minds have set up. Why is such idolatry any better than that of the old wood and stone? If we worship the creations of our minds, why not also those of our hands? The one is indeed a more refined self-adoration than the other; but the radical error remains the same in both. The old idolators were wrong, not because they worshipped themselves, but because they worshipped their creation as if it were their creator; and how can any anthropomorphic theory "escape the same condemnation?" [1]

The origin of the teleological hypothesis is thus pointed out, and its plausibility accounted for. On the one hand, the primitive tendency in man to interpret nature anthropomorphically, and his proneness to lend to his own ideas objective embodiment, are facts admitting no dispute. All history teems with evidences of their wide-spread and deep-rooted influence. Has not fetishism [illegible] time the universal theology, and rea[illegible] dominant philosophy? On the other hand, it is a corollary from the fundamental laws of life that psychical development has followed the course and been determined by the conditions above described. The view here defended may thus far claim at least equal weight with those which maintain the validity of the teleological hypothesis. But we have next to consider a class of phenomena, in the explanation of which that hypothesis appears at a signal disadvantage.

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The perfect adjustment of inner to outer relations is that which constitutes perfect life. Were no chemical or mechanical relations to arise without the organism, too sudden, too intricate, or too unusual, to be met by internal adaptations, death from disease and accident would no longer occur. Were there no concurrence of phenomena defying interpretation and refusing to be classified, there would be perfect knowledge. Were no desires awakened, save such as might be legitimately gratified by the requisite actions, there would be perfect happiness. That the ultimate state of humanity will be characterized by a relatively close approach to such an equilibrium between external requirements and internal resources, is a belief which, however paradoxical it may seem to a superficial observer, is justified by all that we know of history and of biology. It is with reason that the modern mind sees its Golden Age in the distant future, as the ancient mind saw it in the forgotten past. But however bright and glorious may be the destination of mankind, its onward progress is marked by irksome toil and bitter sorrow. Though like the crusading children, in Arnold's beautiful simile, we may cry from time to time, "Jerusalem is reached!" it is only to be rudely awakened from our delusion—to realize that the goal is yet far off, and that many a weary league must be traversed before we can attain it. Meanwhile, grinding misery is the lot of many, regret and disappointment the portion of all. The life of the wisest man is chiefly made up of lost opportunities, defeated hopes, halffinished projects, and frequent failure in the ever-renewed strife between good and evil inclinations. So penetrated are the noblest careers by the leaven of selfish folly, that the conscientious biographer is too often constrained to adopt the tone of apology, mingling condemnation with approval. Side by side with deeds of heroism and sympathetic devotion, history is ever recording deeds of violence and selfish oppression. Undisciplined and conflicting desires are continually coming to fruition in hateful and iniquitous actions. The perennial recurrence of war and persecution, the obstinate vitality of such ugly things as despotism, superstition, fraud, robbery, treachery, and bigotry, show how chaotic as yet is the distribution of moral forces. While the prevalence, here and there, of ignorance and poverty, disease and famine, shows how imperfect as yet is our power to adapt ourselves to the changes going on around us.

That this state of things is temporarily necessitated by the physical constitution of the universe and by the process of evolution itself, may readily be granted.[1] The physical ills with which humanity is afflicted are undoubtedly consequent upon the very movement of progress which is bearing it onward toward relative perfection of life, and moral evils likewise are the indispensable concomitants of its slow transition from the primeval state of savage isolation to the ultimate state of civilized interdependence. They are not obstacles to any scientific theory of evolution, nor do they provide an excuse for gloomy cynicism, but should rather be viewed with quiet resignation, relieved by philosophic hopefulness, and enlightened endeavours to ameliorate them. But though crime and suffering may indeed be destined eventually to disappear, their prevalence throughout the recorded past has none the less been ever the stumbling-block and opprobrium of all anthropomorphic theories of the universe. Just so far as the correspondence between the organism and its environment is complete, does the teleological hypothesis find apparent confirmation. Just so far as the correspondence is incomplete, does it meet with patent contradiction. If harmony and fitness are to be cited as proofs of beneficent design, then discord and unfitness must equally be kept in view as evidences of less admirable contrivance. A scheme which permits thousands of generations to live and die in wretchedness, cannot, merely by providing for the well-being of later ages, be absolved from the alternative charge of awkwardness or malevolence. If there exist a personal Creator of the universe who is infinitely intelligent and powerful, he cannot be infinitely good: if, on the other hand, he be infinite in goodness, then he must be lamentably finite in power or in intelligence. By this two-edged difficulty, Theology has ever been foiled. Vainly striving to elude the dilemma, she has at times sought refuge in optimism; alleging the beneficent results of suffering and the evanescent character of evil, as if to prove that suffering and evil do not really exist. Usually, however, she has taken the opposite course, postulating distinct supernatural sources for the evil and the good.[1] From the Jötuns and Vritras of

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[1] In treating of the special-creation hypothesis (*Principles of Biology*, part iii.) Mr. Spencer calls attention to the numerous cases in which the higher life is sacrificed, without compensation, to the lower, as for example in the case of parasites. This is a formidable objection, not only to the doctrine of special creations, but to anthropomorphic theism in general. But for my present purpose it is quite enough to point out that the constitution of the world is such that even the genesis of higher life involves an enormous infliction of misery upon sentient creatures.

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[1] "Οὐκ ἄρα πάντων γε αἴτιον τὸ ἀγαθόν, ἀλλὰ τῶν μὲν εὖ ἐχόντων αἴτιον, τῶν δὲ κακῶν ἀναίτιον. Οὐδ᾽ ἄρα ὁ Θεός, ἐπειδὴ ἀγαθός, πάντων ἂν εἴη αἴτιος, ὡς οἱ πολλοὶ λέγουσιν, ἀλλ᾽ ὀλίγων μὲν τοῖς ἀνθρώποις αἴτιος, πολλῶν δὲ ἀναίτιος· πολὺ γὰρ ἐλάττω τἀγαθὰ τῶν κακῶν ἡμῖν· καὶ τῶν μὲν ἀγαθῶν οὐδένα ἄλλον αἰτιατέον, τῶν δὲ κακῶν ἄλλ᾽ ἄττα δεῖ ζητεῖν τὰ αἴτια, ἀλλ᾽ οὐ τον Θεόν." Plato, *Republic*, ii. 18 (Bekker). He goes on to refute the Homeric conception of the two jars, *Iliad*, xxiv. 660. See also Aristotle, *Metaphysica*, A. p. 984. b. 17; and compare the views of James Mill, in J. S. Mill's *Autobiography*, p. 40. For those who may wish to revive the Manichæan doctrine, an excellent point of departure has been afforded by Mr. Martineau, in his suggestion that the primary qualities of matter constitute a "datum objective to God," who, "in shaping the orbits out of immensity, and determining seasons out

[illegible] Manichæism [illegible] vestiges of her [illegible] the existence of [illegible] power and bene- [illegible]

[illegible] such objec- [illegible] we are blasphe- [illegible] the Deity by human [illegible] pointing to [illegible] the working out [illegible] understandings [illegible] as we shall see [illegible] when reve- [illegible] resources as [illegible] anthropomorphic [illegible] dilemma [illegible] It is [illegible] of this [illegible] representation of [illegible] anthropomorphic at- [illegible] be ascribed [illegible] of [illegible] manifested [illegible] resolved into [illegible] in

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[illegible] Mr- [illegible] which [illegible] presence. [illegible] Mr. [illegible] inferior [illegible] is not [illegible] See Mr [illegible]

[illegible] his [illegible] see

ascribing goodness to God I do not mean what I mean by goodness; if I do not mean the goodness of which I have some knowledge, but an incomprehensible attribute of an incomprehensible substance, which for aught I know may be a totally different quality from that which I love and venerate—what do I mean by calling it goodness? and what reason have I for venerating it? To say that God's goodness may be different in kind from man's goodness, what is it but saying, with a slight change of phraseology, that God may possibly not be good?" With Mr. Mill, therefore, "I will call no Being good, who is not what I mean when I apply that epithet to my fellow-creatures." And, going a step farther, I will add that it is impossible to call that Being good, who, existing prior to the phenomenal universe, and creating it out of the plenitude of infinite power and foreknowledge, endowed it with such properties that its material and moral development must inevitably be attended by the misery of untold millions of sentient creatures for whose existence their Creator is ultimately alone responsible. *In short, there can be no hypothesis of a "moral government" of the world, which does not implicitly assert an immoral government.* As soon as we seek to go beyond the process of evolution disclosed by science, and posit an external Agency which is in the slightest degree anthropomorphic, we are obliged either to supplement and limit this Agency by a second one that is diabolic, or else to include elements of diabolism in the character of the first Agency itself. And in the latter case the blasphemy—if we choose to call it so—lies at the door of those who, by urging upon us their anthropomorphic hypothesis, oblige us to judge the character of the Deity by human standards; and not at the door of those who simply reveal the true character of that anthropomorphic hypothesis by setting forth its hidden implications.

[illegible] point of view the doct[illegible] [illegible] equally unsatisfactory [illegible] [illegible] unsupported theori[illegible] [illegible] of law, and upo[illegible] [illegible] renders it suspici[illegible] [illegible] of need. The [illegible] [illegible] founded upon the [illegible] [illegible] environment. [illegible] the doctrine [illegible] is not only [illegible] [illegible] of the [illegible] [illegible] [illegible] appea[illegible] [illegible] is shown [illegible] [illegible] with [illegible] idea "Infinite Person" is neither more nor less unthinkable than the pseud-idea "Circular Triangle." As Spinoza somewhere says, *Determinatio negatio est,*—to define God is to deny Him; and such being the case, what can be more irrational than to insist upon thought and volition, phenomena only known to exist within quite narrow limitations, as the very nature and essence of the infinite Deity? What theory of physical or moral phenomena, built upon such an inadequate basis, can be other than unsound and misleading? What wonder if it continually land us in awkward and conflicting conclusions, painful to us alike as inquiring and as religious beings? As Goethe has profoundly said, "Since the great Being whom we name the Deity manifests himself not only in man, but in a rich and powerful Nature, and in mighty world-events, a representation of Him, framed from human qualities, cannot of course be adequate, and the thoughtful observer will soon come to imperfections and contradictions, which will drive him to doubt—nay, even to despair—unless he be either little enough to let himself be soothed by an artful evasion, or great enough to rise to a higher point of view."[1] To those whom the habits of thought which science nurtures have led to believe in the existence of an all-pervading and all-sustaining Power, eternally and everywhere manifested in the phenomenal activity of the universe, alike the cause of all and the inscrutable essence of all, without whom the world would be as the shadow of a vision, and thought itself would vanish,—to these the conception of a presiding anthropomorphic Will is a gross and painful conception. Even were it the highest phenomenal conception which can be framed, it would still be inadequate to represent the Ineffable Reality. But we do not and cannot know even that it is the highest. Hegel was rash with all the metaphysician's rashness when he said that Humanity

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[1] Eckermann, vol. ii. p. 357.

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CHAPTER III.

COSMIC THEISM.

THE conclusions reached in the foregoing chapter were purely negative, and would therefore be very unsatisfactory if we were obliged to rest in them as final. Upon the religious side of philosophy as well as upon its scientific side, the mind needs some fundamental theorem with reference to which it may occupy a positive attitude. According to the theory of life and intelligence expounded in previous chapters, mere scepticism can discharge but a provisional and temporary function. To the frivolously-minded the mere negation of belief may be in no wise distressing; but to the earnest inquirer the state of scepticism is accompanied by pain, which, here as elsewhere, is only subserving its proper function when it stimulates him to renewed search after a positive result. In the present transcendental inquiry it may indeed at first sight seem impossible to arrive at any positive result whatever, without ignoring the relativity of knowledge and proving recreant to the rigorous requirements of the objective method. Nevertheless, as was hinted at the close of the preceding chapter, this is not the case. Although the construction of a theology, or science of Deity, is a task which exceeds the powers of human intelligence, there is nevertheless one supremely important theorem in which science and religion find their permanent reconciliation, and by the assertion of which the mind is brought into a positive attitude of faith with reference to the Inscrutable Power manifested in the universe. The outcome of the present argument is not Atheism or Positivism, but a phase of Theism which is higher and purer, because relatively truer, than the anthropomorphic phase defended by theologians.

This all-important theorem in which science and religion are reconciled, is neither more nor less than the theorem which alone gives complete expression to the truth that all knowledge is relative. In the first chapter of this work it was elaborately proved that as soon as we attempt to frame any hypothesis whatever concerning the Absolute, or that which exists out of relation to our consciousness, we are instantly checkmated by alternative impossibilities of thought, and when we seek to learn why this is so, we are taught by a psychologic analysis that, from the very organization of our minds, and by reason of the very process by which intelligence has been evolved, we can form no cognition into which there do not enter the elements of *likeness*, *difference*, and *relation*,—so that the Absolute, as presenting none of these elements, is utterly and for ever unknowable. Translating this conclusion into more familiar language, we found it to mean, *first*, "that the Deity, in so far as absolute and infinite, is inscrutable by us, and that every hypothesis of ours concerning its nature and attributes can serve only to illustrate our mental impotence,"—and, *secondly*, "that the Universe in itself is likewise inscrutable; that the vast synthesis of forces without us, which in manifold contact with us is from infancy till the close of life continually arousing us to perceptive activity, can never be known by us as it exists objectively, but only as it affects our consciousness."[1]

These are the closely-allied conclusions which were reached in our opening discussion, But since such abstruse theorems need to be taken one by one into the mind, and allowed one after the other to dwell there for a while, in order to be duly comprehended, it did not then seem desirable to encumber the exposition with any reference to the third statement in which these two are made to unite; nor, indeed, would it have been possible to illustrate adequately this third statement until we had defined our position in relation to the questions of phenomenality, of causation and deanthropomorphization, of the persistence of force, and of the evolution of the phenomenal world. But now, having obtained definite conclusions upon these points, we are at last enabled to present the case as a whole. Having seen that in certain senses the Deity and the Cosmos are alike inscrutable, let us now see if there is any sense in which it may be legitimately said that the Unknowable contained in our first theorem is identical with the Unknowable contained in our second theorem.

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[1] See above, vol. i. p. 15.

Upon what grounds did we assert the unknowableness of Deity? We were driven to the conclusion that Deity is unknowable, because that which exists independently of intelligence and out of relation to it, which presents neither *likeness*, *difference*, nor *relation*, cannot be cognized. Now by precisely the same process, we were driven to the conclusion that the Cosmos is unknowable, only in so far as it is absolute. It is only as existing independently of our intelligence and out of relation to it, that we can predicate unknowableness of the Cosmos. As manifested to our intelligence, the Cosmos is the world of phenomena,—the realm of the knowable. We know stars and planets, we know the surface of our earth, we know life and mind in their various manifestations, individual and social. But, as we have seen, this vast aggregate of phenomena exists as such only in relation to our intelligence. Its *esse* is *percipi*. To this extent we have gone with Berkeley. But underlying this aggregate of phenomena, to rce we know. Thus by the persistence of force, we really ean the persistence of some Power which transcends our knowledge and conception. The manifestations, as occurring either in ourselves or outside of us, do not persist; but that which persists is the Unknown Cause of these manifestations. In other words, asserting the persistence of force is but another mode of asserting an Unconditioned Reality, without beginning or end." Thus as "a subjective analysis proved that while, by the very conditions of thought, we are prevented from knowing anything beyond relative being; yet that, by these very same conditions of thought, an indefinite consciousness of Absolute Being is necessitated,—so here, by objective analysis, we similarly find that the axiomatic truths of physical science unavoidably postulate Absolute Being as their common basis."[1]

Combining, therefore, these mutually harmonious results, and stating the theorem of the persistence of force in terms of the theorem of the relativity of knowledge, we obtain the following formula:—*There exists a* POWER, *to which no limit in time or space is conceivable, of which all phenomena, as presented in consciousness, are manifestations, but which we can know only through these manifestations.* Here is a formula legitimately obtained by the employment of scientific methods, as the last result of a subjective analysis on the one hand, and of an objective analysis on the other hand. Yet this formula, which presents itself as the final outcome of a purely scientific inquiry, expresses also the fundamental truth of Theism,—the truth by which religious feeling is justified. The existence of God—the supreme truth asserted alike by Christianity and by inferior historic religions—is asserted with equal emphasis by that Cosmic Philosophy which seeks its data in science alone. Thus, as Mr. Lewes long ago observed, the remark of Comte, that the heavens declare no other glory than the glory of Hipparchos and

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[1] *First Principles*, pp. 189, 190.

Newton, and such others as have aided in detecting the order of sequence among celestial phenomena, seems as irrational to the scientific inquirer as it seems impious to the religious mind. The Cosmist may assert, as consistently as the Anthropomorphist, that "the undevout astronomer is mad." Though science must destroy mythology, it can never destroy religion; and to the astronomer of the future, as well as to the Psalmist of old, the heavens will declare the glory of God.

Before proceeding further to expound this theorem, in which science and religion find their reconciliation, it is desirable to turn aside for a moment and contrast the views here expounded with the views maintained by Comte concerning the true object of the religious feeling. We shall thus the better elucidate our own position, while once more pointing out the world-wide difference between our philosophy and Positivism. Let us examine the conception of Deity formed by the thinker to whom the heavens manifested no other glory than that of Hipparchos and Newton and their compeers.

Comte recognized, though vaguely, the truth that while the human race in the course of its philosophic evolution must outgrow theology, it can never outgrow religion. He justly maintained that, while the conception of a presiding quasi-human Will must eventually be discarded as an inadequate subjective symbol, there will nevertheless remain to the last the powerful sentiment of devotion which has hitherto attached itself to that anthropomorphic conception, but must finally attach itself to some other conception. Throughout future time, while science is supreme, no less than in that past time when mythology was supreme, there must be a religion, and this religion must have an object. So far the position taken by Comte appears to be defensible enough. But now when we come to consider the object of the religious sentiment in Comte's scheme, we must pro-

nounce his position not only irreconcilable with sound philosophy, but hopelessly retrograde as compared even with the current anthropomorphism. Seeing only the negative side of the theorem of relativity, and thus failing explicitly to recognize the existence of that Absolute Power of which the web of phenomena is but the visible garment, he was obliged to search for his Deity in the realm of the finite and the knowable. Working under these conditions, the result at which he finally arrived appears to have been legitimately evolved from the conception of the aims and scope of philosophy which he had framed in early life, at the very outset of his speculations. The thinker who from the beginning consistently occupied the anthropocentric point of view, who regarded philosophy, not as a unified theory of the Cosmos, but as a unified theory of Man, who depreciated the development theory and the study of sidereal astronomy as interfering with his anthropocentric notions, and to whom the starry heavens declared no glory save that of finite men, arrived ultimately at the deification of Humanity. Comte "refers the obligations of duty, as well as all sentiments of devotion, to a concrete object, at once ideal and real; the Human Race, conceived as a continuous whole, including the past, the present, and the future." "It may not be consonant to usage," observes Mr. Mill, "to call this a religion; but the term, so applied, has a meaning, and one which is not adequately expressed by any other word. Candid persons of all creeds may be willing to admit, that if a person has an ideal object, his attachment and sense of duty towards which are able to control and discipline all his other sentiments and propensities, and prescribe to him a rule of life, that person has a religion. . . . Many indeed may be unable to believe that this object is capable of gathering around it feelings sufficiently strong: but this is exactly the point on which a doubt can hardly remain in an intelligent reader of Comte; and we join with him in contemning, as equally

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irrational and mean, the conception of human nature as incapable of giving its love and devoting its existence to any object which cannot afford in exchange an eternity of personal enjoyment."[1] With the general tenour of this passage I heartily agree. I have no sympathy with those critics who maintain that the idea of Humanity is an unworthy idea, incapable of calling forth to a high degree our sentiments of devotion and reverence. No doubt, as the Comtists tell us, the majestic grandeur of which that idea is susceptible can be realized only after long and profound contemplation. And we may perhaps admit, with Mr. Mill, that "ascending into the unknown recesses of the past, embracing the manifold present, and descending into the indefinite and unforeseeable future, forming a collective Existence without assignable beginning or end, it appeals to that feeling of the Infinite which is deeply rooted in human nature." We may still further admit that all morality may be summed up in the disinterested service of the human race,—such being, as already shown (Part II. chap. xxii.), the fundamental principle of the ethical philosophy which is based on the Doctrine of Evolution. And it is, moreover, easy to sympathize with the feeling which led Comte formally to consecrate the memories of the illustrious dead, whose labours have made us what we are; that "communion of saints, unseen yet not unreal," as Carlyle nobly expresses it, "whose heroic sufferings rise up melodiously together unto Heaven, out of all times and out of all lands, as a sacred *Miserere*; their heroic actions also, as a boundless everlasting Psalm of triumph." This intense feeling of the community of the human race, this "enthusiasm of Humanity," as the author of "Ecce Homo" calls it, forms a very considerable part of Christianity when stripped of its mythology, and is one of the characteristics which chiefly serve to difference the world-religion of Jesus and Paul from the ethnic religions of antiquity.

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[1] Mill, *Auguste Comte and Positivism*, p. 122.

Nevertheless, after freely acknowledging all these points of excellence in the Comtean conception, it must still be maintained that Comte's assignment of Humanity as the direct object of religious worship was a retrograde step, when viewed in contrast, not only with the cosmic conception of Deity already clearly foreshadowed by Goethe, but even with the anthropomorphic conception as held by contemporary liberal theologians. A fatal criticism—omitted, and apparently overlooked by Mr. Mill, in his account of the Comtean religion—remains to be made upon it. I do not refer to the difficulty of ascribing godhood to a product of evolution, neither is it necessary to insist upon the marvellous shading-off of collective apehood into Deity which must puzzle the Comtist who stops to confront his theory with the conclusions now virtually established concerning man's origin; though beneath the cavil and sarcasm which cannot be kept from showing itself upon the surface of such objections, there lies just scientific ground of complaint against the Comtean hypothesis. The criticism to which I refer is one the force of which must be acknowledged even by those who have not yet learned to estimate the resistless weight of the evidence by which the development theory is supported. However grand Humanity may be as an object of contemplation, it is still finite, concrete, and knowable. It has had a beginning; in all probability it is destined to have an end. We can no longer, since the Copernican revolution, regard it as the chief and central phenomenon of the universe. We know it but as a local assemblage of concrete phenomena, manifested on the surface of a planet that is itself a lesser member of a single group among innumerable groups of worlds. It is no less significant than amusing that toward the last Comte would fain have banished from astronomy not only the study of the stars, but even the study of those planets in our own system which do not considerably perturb the motions of the earth. He wished to exclude from science everything which does not conspicuously affect human interests, and everything which by its magnitude dwarfs the conception of Humanity. Far sounder would his views have been had he now and then permitted his thoughts to range to the uttermost imaginable limits of the sidereal universe, and brought himself duly to realize how by the comparison Humanity quite loses its apparent infinitude. Or had he more carefully analyzed the process of human thinking itself, the study of which he stigmatized as "metaphysical" and fruitless, he might perhaps have seen that the world of phenomena speaks to us everywhere and at all times, if we only choose to listen, of an Infinite and Unknowable Reality, whereas the conception of Humanity is but the conception of a Finite and Knowable Phenomenon. Here we touch the bottom of his error. This great Being, says the Comtist, this collective Humanity, is our supreme Being,—"the only one we can know, *therefore* the only one we can worship." On the other hand, the Cosmist asserts, what we know is not what we worship; what we know is matter of science; it is only when science fails and intelligence is baffled, and the Infinite confronts us, that we cease to analyze and begin to worship. What men have worshipped from the earliest times, has been not the Known, but the Unknown. Even the primeval savage who worshipped plants and animals worshipped them only in so far as their modes of action were mysterious to him,—only in so far as they constituted a part of the weird uninterpreted world by which he was surrounded. As soon as he had generalized the dynamic phenomena presented by the plant or the animal, that is, as soon as it became an object of knowledge, it ceased to be an object of worship. As soon as the grander phenomena of sunrise and sunset, storm and eclipse, had been partially generalized directly worshipped, but unseen agents were imagined as controlling the phenomena by their arbitrary volitions, and these agents, as being mysterious, were worshipped. So when polytheism began to give place to monotheism, the process was still the same. The visible and tangible world was regarded as the aggregate of things which might be understood; but above and beneath all this was the mysterious aspect of things—the Dynamis, the Demiurgus, the Cause of all, the Ruler of all—and this mighty Something was worshipped. Though theology has all along wrestled with the insoluble problems presented by this supreme Mystery, and, by insisting on divers tangible propositions concerning it, has implicitly asserted that it can be at least partially known; the fact remains that only by being unknown has it continued to be the object of the religious sentiment. Could the theologian have carried his point and constructed a "science of Deity;" could the divine nature have been all expressed in definite formulas, as we express the genesis of vegetation or the revolutions of the planets, worship would have disappeared altogether. Worship is ever the dark side of the shield, of which knowledge is the bright side. It is because science can never explain the universe, it is because the enlarging periphery of knowledge does but reveal from day to day a greater number of points at which we meet the unknowable lying beyond, that religion can never become obsolete. Though we have come to recognize the most refined symbols by which men have sought to render Deity intelligible as inadequate and misleading symbols; though we sacrifice the symbol of personality, because personality implies limitation, and to speak of an infinite personality is to cheat oneself with a phrase that is empty of meaning; yet our recognition of Deity is only the more emphatic. Thus "the object of religious sentiment will ever continue to be that which it has ever been." The God of the

scientific philosopher is still, and must ever
the Christian, though freed from the illegiti
by the aid of which theology has sought to
comprehensible. What is this wondrous D
manifests itself to our consciousness in harm
throughout the length and breadth and dep
verse, which guides the stars for countless
that never err, and which animates the mo
dew-drop that gleams for a brief hour o
lawn, — whose workings are so resistless t
naught to do but reverently obey them, ye
that we can place our unshaken trust in th
to-day, and for ever? When, summing up
one most comprehensive epithet, we call it
but using a scientific symbol, expressing an a
consciousness, which is yet powerless to e
effable Reality. To us, therefore, as to the I
the very name of Jehovah is that which is not
Push our scientific research as far as we
generalization until all phenomena, past, prese
are embraced within a single formula;—w
fathom this ultimate mystery, we shall be
comprehension of this omnipresent Energy.
must ever reverently pause, acknowledging t
the mystery of mysteries. Here religion m
sway, reminding us that from birth until
dependent on a Power to whose eternal de
submit, to whose dispensations we must res
and upon whose constancy we may implicitly

Thus we begin to realize, more vividly than t
have taught us to realize, the utter absurdit
Thus is exhibited the prodigious [illegible] of
informed mankind that he had [illegible] the
telescope and found no God the[illegible]
phenomenon! Thus, too, we

thropomorphism which represents the infinite Deity as acting through calculation and contrivance, just as finite intelligence acts under the limitations imposed by its environment. And thus, finally, we perceive the hopeless error of the Positivist, who would give us a finite knowable, like Humanity, for an object of religious contemplation. The reasoning which demonstrates the relativity of knowledge, demonstrates also the failure of all such attempts to bind up religion in scientific formulas.

The anthropomorphic theist, habitually thinking of God as surrounded and limited by an environment or "objective datum," will urge that the doctrine here expounded is neither more nor less than Pantheism, or the identification of God with the totality of existence. So plausible does this objection appear, at first sight, that those who urge it cannot fairly be accused either of dulness of apprehension or of a desire to misrepresent. Nevertheless it needs but to look sharply into the matter, to see that the doctrine here expounded is utterly opposed to Pantheism. Though the word "pantheism" has been almost as undiscriminatingly bandied about among theological disputants as the word "atheism," it has still a well-defined metaphysical meaning which renders it inapplicable to a religious doctrine based upon the relativity of knowledge. In the pantheistic hypothesis the distinction between absolute and phenomenal existence is ignored, and the world of phenomena is practically identified with Deity. Of this method of treating the problem the final outcome is to be seen in the metaphysics of Hegel, in which the process of evolution, vaguely apprehended, is described absolutely, as a process of change in the Deity, and in which God, as identified with the totality of phenomenal existence, is regarded as continually progressing from a state of comparative imperfection to a state of comparative perfection. Or, in other words—to reduce the case to the shape in which it was presented in the first chapter of this work—the Universe, as [illegible] anthropomorphic theism [illegible] observed in another [illegible] one that which it was [illegible] the change in theistic [illegible] the philosophic hypothesis [illegible] the human and [illegible]

[illegible] at the beginning of this [illegible] with the Cosmos [illegible] that returned [illegible] so far as secret is [illegible] thus regarding [illegible] as the individual [illegible]

[illegible] There was a [illegible] that God should be [illegible] it now seems [illegible] invested with quasi-human intelligence and volition. But for us to concede the justice of the latter restriction would be as unphilosophical as it would have been for the early monotheists to concede the justice of the former. Just as the early Christians persisted in calling themselves theists while asserting that God dwells in a temple not made with hands, so may the modern philosopher persist in calling himself a theist while rejecting the arguments by which Voltaire and Paley have sought to limit and localize the Deity. Following out the parallel, we might characterize the doctrine here expounded as the "higher theism," in contrast with the "lower theism" taught in the current doctrine. Or in conformity with the nomenclature which has already done us such good service, we may still better characterize it as Cosmic Theism, in contrast with the Anthropomorphic Theism of those theologians who limit the Deity by an "objective datum."

This happy expression of Mr. Martineau's lays bare the anthropomorphic hypothesis to the very core, and when thoroughly considered, lets us into the secret of that superficial appearance of antagonism between Science and Religion which has disturbed so many theologians and misled so many scientific inquirers. Though as an act of lip-homage anthropomorphism asserts the infinitude and omnipotence of God, yet in reality it limits and localizes Him. Though it overtly acknowledges that "in Him we live and move and have our being," yet it tacitly belies this acknowledgment by the implication, which runs through all its reasonings, that God is a person localized in some unknown part of space, and that the universe is a "datum objective to God" in somewhat the same sense that a steam-engine is an "objective datum" to the engineer who works it. I do not say that such a conception would be avowed by any theologian: as thus overtly stated, it would no doubt be generally met with an emphatic disclaimer. Nevertheless this conception, whether avowed or disclaimed, lies at the bottom of all the arguments which theologians urge either against the theory of evolution or against any other theory which extends what is called "the domain of natural law." Take away this conception, and not only do their specific arguments lose all significance, but their entire position becomes meaningless: there ceases to be any reason for their opposing instead of welcoming the new theory. For if "extending the domain of natural law" be equivalent to "extending our knowledge of Divine action," what objection can the theologian logically make to this? Manifestly his hostile attitude is wholly prescribed by his belief, whether tacit or avowed, that the sphere of natural law and the sphere of Divine action are two different spheres, so that whatever is added to the former is taken from the latter. It is assumed that the universe is a sort of lifeless machine, which under ordinary circumstances works along without immediate Divine superintendence, in accordance with what are called natural laws, very much as the steam-engine works when once set going, in accordance with the harmoniously cooperating properties of its material structure. Only by occasional interposition, it is assumed, does God manifest his existence,—by originating organic life, or creating new species out of dust or out of nothing, or by causing prodigies to be performed within historic times for the edification of gaping multitudes. So deep-seated is this assumption—so vitally implicated is it with all the habits of thought which theology nurtures—that we sometimes hear it explicitly maintained that when natural law can be shown to be co-extensive with the whole of nature, then our belief in God will *ipso facto* be extinguished.

Such a position is no doubt as irreligious as it is unscientific: but it is not difficult to see how it has come to be so commonly maintained. Not only is it [illegible] apparently justified by the unphilosophical l[illegible] especially of those shallow wr[illegible] —who speak of "natural law [illegible] ferent from "Divine action;" but it is also the logical offspring of that primitive fetishism from which all our theology is descended. For as physical generalization began to diminish the sphere of action of the innumerable quasi-human agencies by which fetishism sought to account for natural phenomena, there could hardly fail to arise a belief in some sort of opposition between invariable law and quasi-human agency. On the one hand you have a set of facts that occur in fixed sequences, and so are not the result of anthropomorphic volition; on the other hand you have a set of facts that seem to occur according to no determinable order, and so are the result of anthropomorphic volition. The fetishistic thinker could not, of course, formulate the case in this abstract and generalized way; but there can be no doubt that a crudely felt antithesis of the kind here indicated must have been nearly coeval with the beginnings of physical generalization. Now the gradual summing up and blending together of all the primeval quasi-human agencies into one grand quasi-human Agency, could not at once do away with this antithesis. On the contrary, the antithesis would naturally remain as the generalized opposition between the realm of "invariable law" and the realm of "Divine originality." It would be superfluous to recount the various metaphysical shapes which this conception has assumed, in some of which Nature has even been personified as an intelligent and volitional agency, distinct from God, and working through law while God works through miracle. The result has been that, as scientific generalization has steadily extended the region of "natural law," the region which theology has assigned to "Divine action" has steadily diminished, until theological arguments have become insensibly pervaded by the curious assumption that the greater part of the universe is godless. For it is naïvely asked, if plants and animals have been naturally originated, if the world as a whole has been evolved and not created, and if human actions conform to law, what is there left for God to do?[1] If not formally repudiated, is he not thrust back into the past eternity, as an unknowable source of things, which is postulated for form's sake, but might as well, for all practical purposes, be omitted?

The reply is that the difficulty is one which theology has created for itself. It is not science, but theology, which has thrust back Divine action to some nameless point in the past eternity and left nothing for God to do in the present world. For the whole difficulty lies in the assumption of the material universe as a "datum objective to God," and in the consequent distinction between "Divine action" and "natural law,"—a distinction for which science is in nowise responsible. The tendency of modern scientific inquiry, whether working in the region of psychology or in that of transcendental physics, is to abolish this distinction, and to regard "natural law" as merely a synonym of "Divine action." And since Berkeley's time the conception of the material universe as a "datum objective to God" is one which can hardly be maintained on scientific grounds. It is scientific inquiry, working quite independently of theology, which has led us to the conclusion that all the dynamic phenomena of Nature constitute but the multiform revelation of an Omnipresent Power that is not identifiable with Nature. And in this conclusion there is no room left for the difficulty which baffles contemporary theology. The scientific inquirer may retort upon the theologian:—Once really adopt the conception of an ever-present God, without whom not a sparrow falls to the ground, and it becomes self-evident that the law of gravitation is but an expression of a particular mode of Divine action. And what is thus true of one law is true of all laws. The Anthropomorphist is naturally alarmed by the continual detection of new uniformities, and the discovery of order where before there seemed to be disorder; because his conception of Divine action has been historically derived from the superficial contrast between the seemingly irregular action of will and the more-obviously regular action of less complex phenomena. The Cosmist, on the other hand, in whose mind Divine action is identified with orderly action, and to whom a really irregular phenomenon would seem like the manifestation of some order-hating Ahriman, foresees in every possible extension of knowledge a fresh confirmation of his faith in God, and thus recognizes no antagonism between our duty as inquirers and our duty as worshippers. He will admit no such inherent and incurable viciousness in the constitution of things as is postulated by the anthropomorphic hypothesis. To him no part of the world is godless. He does not rest content with the conception of "an absentee God, sitting idle, ever since the first Sabbath, at the outside of his universe, and 'seeing it go;'" for he has learned, with Carlyle, "that this fair universe, were it in the meanest province thereof, is in very deed the star-domed City of God; that through every star, through every grass-blade, and most through every living soul, the glory of a present God still beams."[1]

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[1] "Illos omnes Deum aut saltem Dei providentiam tollere putant, qui res et miracula per causas naturales explicant aut intelligere student." Spinoza, *Tractatus Theologico-Politicus*, vi. *Opera*, iii. 86. "Οὐ γὰρ ἠνείχοντο τοὺς φυσικοὺς καὶ μετεωρολέσχας τότε καλουμένους, ὡς εἰς αἰτίας ἀλόγους καὶ δυνάμεις ἀπρονοήτους καὶ κατηναγκασμένα πάθη διατρίβοντας τὸ θεῖον." Plutarch, *Nikias*, cap. 23. The complaint, it will be seen, is the same in modern that it was in ancient times. Compare Plutarch, *Periklês*, cap. 6; Cicero, *Tusc. Disp.* i. 13, *Opera*, ed. Nobbe, tom. viii. p. 299.

From the anthropomorphic point of view it will quite naturally be urged in objection, that this apparently-desirable result is reached through the degradation of Deity from an "intelligent personality" into a "blind force," and is therefore in reality an undesirable and perhaps even quasi-atheistic result. To the theologian the stripping-off the anthropomorphic vestments with which men have sought to render the Infinite representable in imagination, always means the leaving of nothing but "blind force" as a residuum. Trained upon the subjective method, and habitually applying to all propositions the test of metaphysical congruity only, he naturally regards the possibilities of human thought as fairly representative of the possibilities of existence. Accordingly since human intelligence is the highest mode of Being which we know—being in the nature of things the highest mode, since it is the mode in which we ourselves exist, and which we must therefore necessarily employ as a norm by which to estimate all other modes—the theologian infers that any higher mode of Being is not only inconceivable but impossible. And so, when a vast extension of our knowledge of nature shows (or seems to show) that the workings of quasi-human intelligence form but an inadequate and misleading symbol of the workings of Divine Power, it naturally seems to the theologian that we are giving up an "intelligent personality" for a "blind force."

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[1] *Sartor Resartus*, bk. ii. chap. vii.; bk. iii. chap. viii.

Here, however, as before, the difficulty is one which theology has created for itself. It is not science, but theology, which conjures up a host of phantom terrors by the gratuitous use of the question-begging epithet "blind force." The use of this, and of the kindred epithet "brute matter," implies that matter and force are real existences,—independent "data objective to" consciousness. Such a view, however, as already shown, cannot be maintained. To the scientific inquirer, the terms "matter" and "force" are mere symbols which stand *tant bien que mal* for certain generalized modes of Divine manifestation: they are no more real existences than the x and y of the algebraist are real existences. The question as to identifying Deity with Force is, therefore, simply ruled out. The question which really presents itself is quite different. Theologically phrased, the question is whether the creature is to be taken as a measure of the Creator. Scientifically phrased, the question is whether the highest form of P[illegible] gested to one petty race of creatures by its ephemeral experience of what is going on in one tiny corner of the universe, is necessarily to be taken as the equivalent of that absolutely highest form of Being in which all the possibilities of existence are alike comprehended. It is the same question which confronted us in our opening chapter, and which returned to confront us in sundry other chapters of our Prolegomena. Already we have more than once answered it, in a general way, by showing that "the possibilities of thought are not coextensive with the possibilities of things." We have now to give it a more special answer, by inquiring into the possibility of a mode of existence not limited by the conditions which limit conscious existence within the narrow domain of our terrestrial experience. In other words, we have to inquire into the relations between Matter and Spirit; and the inquiry, besides throwing light on questions which must have arisen in the course of our exposition of the evolution of life and intelligence, will also furnish us with the means for emphasizing the theistic conclusions obtained in the present chapter.

CHAPTER IV.

MATTER AND SPIRIT.

It is the usual lot of scientific writers who maintain theories which have not yet become popular with the theological world to be accused of holding opinions which they not only do not hold, but against which they have perhaps, on every fitting occasion, publicly and emphatically protested. Partly, no doubt, such misrepresentations arise from that carelessness (to call it by no worse name) which too often characterizes the statements of persons who have come to believe that the interests of sacred truth have been committed to them for safe keeping. Whether the truth in question derives its sacredness from time-hallowed tradition or what are called the "higher instincts of our nature," whether its self-appointed guardians are conservative theologians or radical humanists, extreme devotion to its interests is liable to be accompanied by a lofty disregard for that accuracy of statement which to the scientific inquirer seems so indispensable. It appears to be tacitly assumed that the interests of Truth in the abstract can be rightly subserved only by the sacrifice of divers humble concrete truths. Abundant evidence of this is to be found in the tracts and speeches of "secularists," "labour reformers," "friends of the [illegible] other sentimen[illegible]

As regards theologians, a great deal is to be said in behalf of their intolerance of opinions which they honestly believe to be fraught with spiritual and moral evil. But this zeal in the cause of Truth too often betrays them into misrepresentations which suggest that the maxim *Nulla fides cum hæreticis* has not yet been completely expunged from their moral code. Especially in the use of unpopular question-begging epithets they are by no means sufficiently scrupulous. Such epithets as "materialism" and "atheism," being extremely unpopular, have long been made to do heavy duty in lieu of argument. In this sort of barbario warfare the term "materialism" is especially convenient, by reason of a treacherous ambiguity in its connotations. Certain abstract theorems of metaphysics are correctly described as constituting materialism; and the persons who assert them are correctly called materialists. On the other hand, those persons are popularly called materialists who allow their actions to be guided by the desires of the moment, without reference to any such rule of right living as is termed a "high ideal of life." Persons who worship nothing but worldly success, who care for nothing but wealth, or fashionable display, or personal celebrity, or sensual gratification, are thus loosely called materialists. The term can therefore easily be made to serve as a poisoned weapon, and there are theologians who do not scruple to employ it as such against the upholders of philosophic opinions which they do not like but are unable to refute. A most flagrant instance was recently afforded by a lecturer on Positivism, who, after insinuating that pretty much the whole body of contemporary scientific philosophers are Positivists, and that Positivists are but very little better than materialists, proceeded to inform his audience that "materialists" are men who led licentious lives.

It would be hard to find words strong enough to characterize the villany of such misrepresentations as this

[illegible] suppose them to be deliberately intended
[illegible] moral turpitude, were it not
[illegible] the product of extreme sloven-
[illegible] with culpable carelessness of as-
[illegible] conceived arguments upon which
[illegible] like this:—Every attempt to
[illegible] phenomena by means of
[illegible] interpret the movements of
[illegible] of materialism; the assertion
[illegible] of personal immortality;
[illegible] derives morality of its
[illegible] from having any higher
[illegible] egoistic desires; *ergo*,
[illegible] philosophers who inter-
[illegible] to material struc-
[illegible] Such is the tacit
[illegible] theological misrepre-
[illegible] confusion which it
[illegible] the bigotry
[illegible] In truth, a more
[illegible] method
[illegible] from
[illegible]

to material structure involves the assertion of materialism. This is the *non sequitur* which lies at the very bottom of the theological misrepresentation, and its utter fallaciousness needs to be thoroughly exposed.

It would be grossly unjust to throw all the blame of this particular *non sequitur* upon the theologians, who have enough logical delinquencies of their own to answer for, without being required to carry the burden of their adversaries' errors into the bargain. The illegitimate inference is one which scientific writers, and philosophers of a certain school, have been quite as ready to make as theologians: indeed, I believe it was the former who first suggested it to the latter. At all events, without going into historical minutiæ concerning the origin of materialism, but confining our attention to its more recent scientific phases, we may observe that it was not a theologian, but an eminent man of science, who first suggested that the results of modern objective psychology might be represented in the formula, *Ohne Phosphor kein Gedanke.* This formula has been caught up as a watchword by a school of atheistic writers, some of whom, as Moleschott and Vogt, rank very high as scientific specialists, but none of whom seem to be worthy of mention for psychological capacity or for acquaintance with the best thoughts of modern philosophy. The most conspicuous representative of this school is Dr. Büchner,—a writer who deserves praise for his power of lucid exposition, but whose pages are too often deformed with brutalities of expression for which no atonement is made in the shape of original or valuable thought. Although this writer has no scientific reputation whatever, and although his school has no more claim to rank with the great schools of philosophy in our time than it had when the now-forgotten Lamettrie represented it in the days of Hume and Kant, yet through loudness of asseveration it has succeeded in doing much to mislead and perplex the public mind with reference to the philosophic results of recent scientific inquiry. Because Dr. Büchner and his followers point to certain discoveries in nervous physiology or in transcendental physics as evidence of the materiality of mind, it has come to be currently supposed that those scientific inquirers who accept the discoveries accept also the materialistic inference. And because the ablest scientific inquirers, being more occupied in hunting for truths than in looking about for ugly consequences, have seldom said anything on either side of the question, their silence has been interpreted as equivalent to assent, both by the materialists and by the theologians. Energetic protests, however, have been made against this erroneous interpretation, by Prof. Tyndall on the part of molecular physics, and by Prof. Huxley on the part of physiology; while Mr. Spencer has most conclusively demonstrated that, from the scientific point of view, the hypothesis of the materialists is not only as untenable to-day as it has ever been, but must always remain inferior in philosophic value to the opposing spiritualistic hypothesis. Let us look at some of the arguments which necessitate this conclusion.

"No thought without phosphorus!" This remark of Moleschott's has been called a "trenchant" remark. To me it seems a very barren piece of truism. I have no doubt that a century hence, the fact that such a remark should have been regarded either as a valuable novelty or as an alarming heresy, will be cited in evidence of the intellectual dulness of our time. If the aphorism is not restricted to the conditions under which thinking occurs within the limits of our experience, it is merely an audacious assertion, not worthy of serious refutation. If it is thus restricted, it becomes a mere platitude. Within the limits of our experience no one supposes that thinking is done without a body. No philosopher of any school whatever, theological or scientific, maintains that, during the period of human life, there is such a thing as consciousness without brain. None will assert, that, under terrestrial conditions, we have any experience of psychical manifestation apart from physical structure. When, therefore, some speculative physiologist singles out one of the most important chemical ingredients of brain-substance, and tells us that there is no thinking done without that chemical ingredient, we have no good ground either for rejoicing over increased wisdom, or for alarm at possible conclusions. The conclusions to be drawn, whatever they may be, remain just the same as before. Vision is essentially a psychical process; yet no one pretends that vision can be accomplished without an eye. If I were to proclaim on the house-tops, " No vision without retinal rods," would not the common-sense of mankind either rebuke my audacity in pretending that I had got possession of a new and wonderful truth, or derisively inquire my reasons for making so much outcry over such a manifest platitude

The case remains entirely unaltered when we come to such a minute comparison of psychical manifestation and brain-action as was indicated in our chapter on the Evolution of Mind. Whatever theory be held with regard to a future life, he who admits that during the present life mental action in the gross is correlated with brain-action in the gross, can in no wise complain of an attempt to trace out the detailed correlations between mental action in the little and brain-action in the little. If the brain is the organ of Mind, and if the daily manifestations of Mind, in all their complexity, are conditioned by the possession of such a complex organ, then the simple ultimate elements of which the complex mental manifestations are made up, must be severally conditioned by the simple ultimate elements, structural and functional, which make up the complex organ and its molecular activities. In proceeding to trace out these simple ultimate correlations, we are merely analyzing two complicated groups of phenomena into their elements, in order that we may arrive at a better practical understanding

[illegible]

[illegible] the transmi [illegible] accompany s [illegible] the same relation of [illegible] traces out th nervous system and the accompanying evolution of intelligence, from the lowest to the highest forms of life."[1]

It appears, therefore, that, so far as objective psychology is concerned, but little support has as yet been obtained for the materialistic hypothesis. The most that psychology, working with the aid of physiology, has thus far achieved, has been to show that, within the limits of our experience, there is an *invariable concomitance* between psychical phenomena and the phenomena of nervous action; and this, as we have seen, is but the elaborate analytic statement of a plain truth, which is asserted alike by philosophers of every school and by the common-sense of every human being,—namely, that from birth until death there is no manifestation of Mind except in association with Body. But beyond this it is quite clear that objective psychology can never go. The most that psychology, working with the aid of physiology, can ever achieve, will be to show the invariable concomitance between nervous and psychical phenomena, within the limits of our experience. The most it can ever do will be to illustrate, with more and more minute detail, that same proposition in asserting which it has been from the outset upheld by the universal consent of mankind. To enlarge the scope of that proposition, to add to it new ulterior implications, must for ever remain beyond its power. Or if this is still not perfectly clear, the kindred considerations now to be drawn from the study of transcendental physics will make it clear.

It has been not uncommonly taken for granted, both by materialists and by theologians, that molecular physics, in establishing a quantitative correlation between the various modes of motion manifested throughout organic and inorganic nature, has supplied a basis whereon to found some theory of the materiality of Mind. Here, as before, the theologians have accepted the materialistic inference and aimed their assaults at the irrefragable scientific theorem, instead of admitting the scientific theorem and showing that, when rightly understood, it does not afford a premise for the materialistic inference. Mr. Spencer pithily remarks that the one class show by their fears, quite as much as the others show by their hopes, that they believe in the theoretical possibility of resolving mental phenomena into motions of matter; whereas those who really comprehend the import of modern discoveries in molecular physics are more thoroughly convinced than ever that any such reduction is utterly beyond the bounds of possibility. A brief consideration will suffice to show us that one of the great results of the discovery of the correlation of forces is the final destruction of the central argument by which materialism has sought to maintain its position. Henceforth the spiritualistic hypothesis may, perhaps, be still regarded as on trial, in so far as it needs much further explanation and limitation; but the materialistic hypothesis is doomed irretrievably.

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[1] *Principles of Psychology*, vol. i. p. 617.

For let us note well what is implied in the assertion that sun-derived radiance is metamorphosed, first into the static energy of vegetable tissue, and afterwards into the dynamic energy which maintains the multiform activity of the animal organism; and that through the liberation of a part of such dynamic energy, in the form of discharges between interconnected ganglia, there are rendered possible the phenomena of conscious activity.[1] Let us endeavour to mark out precisely what is meant by this assertion. In its present form it is a concrete statement, based upon the abstract truths that, within the limits of our experience, any given species of motion whatever has acquired its distinctive attributes through transformation from some other species, and will again lose these distinctive attributes through a subsequent transformation. For example, the heat which now raises the temperature of a pound of water just one degree of Fahrenheit, has acquired its present form of existence through the transformation of as much molar motion as is implied in the fall of 772 pounds of matter through one foot of space; and it will lose its present form of existence as fast as it is retransformed into molar motion of expansion, or into other modes of molecular motion, according to superinduced circumstances. So when food is taken into the organism and assimilated with the tissues, the quantity of molecular motion involved in the secretion of bile by the liver, or in the raising of the arm by an act of will, or in the knitting of a new plexus of associated ideas by the opening of new communications between brain-cells, may equally be said to have acquired its present specific forms through transformation from the potential motion latent in the prepared food. So we may say, very roughly, that there is a metamorphosis of molar motion into heat and actinism; of heat and actinism into the potential motion latent in the nutriment ultimately derived from sun-nourished vegetable tissues; of this potential motion into undulations among the molecules of nerve; of these undulations back into molar motions of the muscles which move limbs, or into molecular motions of secreting glands, and so on, in a never-ending circuit. The circuit is thus very roughly described, but such is essentially its character. But now let us note that throughout this wondrous circuit, from molar motion to molecular nerve-motion, and back again to molar motion, there is no question of Mind whatever. The metamorphosis is always from one species of material motion into some other species of material motion, but never from a species of material motion into an idea or a feeling. The dynamic circuit is absolutely complete without taking psychical manifestations into the account at all. Now obviously the most that molecular physics can ever accomplish will be to point out, in more and more minute detail, the characteristics of the various metamorphoses which occur within the limits of this circuit. The ideal goal of physical

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[1] See above, vol. i. pp. 411, 416.

inquiry would be to furnish algebraic equations for every curve described by every particle of matter during the entire series of transformations, from the arrested molar motions of the gravitating particles of the sun, down to the endlessly-complex molecular motions which take place within the cerebral tissue of a mathematician engaged in solving partial differential equations. However stupendous such an achievement may seem to us who are as yet in the callow infancy of scientific inquiry, there is nevertheless no radical absurdity involved in conceiving it as theoretically possible. But now let us suppose all this actually achieved. Let us suppose physical inquiry to have reached its uttermost conceivable limit, having reduced the whole problem of motion, in all its myriad manifestations, in both inorganic and organic nature, to a purely algebraic problem, for the solution of which the requisite algebraic devices are at hand; and let us consider what we have thus achieved. Have we made the first step toward the resolution of psychical phenomena into modes of motion? Obviously we have not. The closed circuit of motion, motion, motion, remains just what it was before. No conceivable advance in physical discovery can get us out of this closed circuit, and into this circuit psychical phenomena do not enter. Psychical phenomena stand *outside* this circuit, *parallel* with that brief segment of it which is made up of molecular motions in nerve-tissue. However strict the parallelism may be, within the limits of our experience, between the phenomena of mind and this segment of the circuit of motions, the task of transcending or abolishing the radical antithesis between the phenomena of mind and the phenomena of motions of matter, must always remain an impracticable task. For in order to transcend or abolish this radical antithesis, we must be prepared to show how a given quantity of molecular motion in nerve-tissue can become transformed into a definable amount of ideation or feeling. But this, it is quite safe to say, can never be done. Free as we were, a moment ago, to admit the boundless possibilities of scientific inquiry in one direction, we may here at once mark the bounds beyond which, in another direction, scientific inquiry cannot advance.

For in the last resort it is subjective psychology which must render the decisive verdict as to the possibility of identifying feeling with motion; and to obtain this decisive verdict there is but one legitimate way. By a physical analysis we must ascertain what is the primordial element in motion, and by a psychological analysis we must ascertain what is the primordial element in feeling; it must then be left for consciousness to decide whether these two primordial elements are or are not in such wise like each other that the one may be substituted for the other indifferently; and from this verdict there can, in the nature of the case, be no appeal. Now it would be very rash to suppose that we have as yet arrived at a knowledge of the primordial unit, either of motion or of feeling: still we have made an approximation sufficient for the purposes of the present argument. Our analysis has progressed so far as to enable us to foresee the verdict, and to rest assured that further analysis will reiterate and not reverse it. In the chapter on the Composition of Mind, we saw that "the physical action which accompanies psychical changes is an undulatory displacement of molecules, resulting in myriads of little waves or pulses of movement." We saw also that, "as a cognizable state of consciousness is attended by the transmission of a number of little waves from one nerve-cell to another, so the ultimate psychical elements of each conscious state must correspond to the passage of these little waves taken one by one." And we were "led to infer, as the ultimate unit of which Mind is composed, a simple *psychical shock*, answering to that simple *physical pulsation* which is the ultimate unit of nervous action."[1] Here, then, are our approximately-primordial

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[1] See above, p. 131.

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enormous progress achieved during the past forty years in the analysis of both physical and psychical phenomena, has been the final and irretrievable overthrow of the materialistic hypothesis. Henceforth we may regard materialism as ruled out, and relegated to that limbo of crudities to which we some time since consigned the hypothesis of special creations. The latest results of scientific inquiry, whether in the region of objective psychology or in that of molecular physics, leave the gulf between Mind and Matter quite as wide as it was judged to be in the time of Descartes. It still remains as true as then, that between that of which the differential attribute is Thought and that of which the differential attribute is Extension, there can be nothing like identity or similarity. Although we have come to see that between the manifestations of the two there is such an unfailing parallelism that the one group of phenomena can be correctly described by formulas originally invented for describing the other group, yet all that has been established is this parallelism. When it comes to the task of making the parallels meet, we are no better off than Malebranche with his Occasional Causes, or Leibnitz with his Pre-established Harmony: nay, we are no better off than the ancient Gnostics, with their "æons" and their "Demiurge." Rich as are the harvests which science has obtained from these two fields, the fence which divides them has never been broken down; and until the insuperable distinction between Subject and Object, between the Conscious and the Unconscious, can be transcended, it can never be broken down.

But while the materialistic hypothesis is thus irretrievably doomed, it is otherwise with the opposing spiritualistic hypothesis. It is true that we cannot directly translate Matter in terms of Spirit, any more than we can translate Spirit in terms of Matter. But we have seen that the term "matter" does not stand for any real existence, but only for one of the modes in which an Inscrutable Existence reveals itself to us,

within the limits of our terrestrial experien
[illegible] so much that we go with
[illegible] asserting that the term "matt
[illegible] that group of phenom
[illegible] as [illegible] extension, colour, etc.[1]
[illegible] range of admissib
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[illegible] Inscrutable Existence of which the u
[illegible] manifestation, we sh
[illegible] essence may conceivably be identif
[illegible] essence of what we know as Mind
show how this can be, I shall cite from
somewhat lengthy passage, to which the atte
has hitherto been too little directed.

"Mind, as known to the possessor of it, is a
aggregate of activities; and the cohesion of t
one with another, throughout the aggregate
postulation of a something of which they are
But the same experiences which make him
coherent aggregate of mental activities, simult
him aware of activities that are not included
activities which become known by their e
aggregate, but which are experimentally pro
coherent with it, and to be coherent with one
y the definition of them, these external activ
brought within the aggregate of activities d
those of Mind, they must for ever remain t
more than the unknown correlatives of their
aggregate; and can be thought of only in t
by this aggregate. Hence, if he regards his
these activities lying beyond Mind, as cons
ledge of them, he is deluding himself; he is b
these activities in terms of Mind, [illegible]

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[1] See above, vol. [illegible]
[2] See, in this co[illegible] Pri[illegible]

wise. Eventually he is obliged to admit that his ideas of Matter and Motion, merely symbolic of unknowable realities, are complex states of consciousness built out of units of feeling. But if, after admitting this, he persists in asking whether units of feeling are of the same nature as the units of force distinguished as external, or whether the units of force distinguished as external are of the same nature as units of feeling; then the reply, still substantially the same, is that we may go farther towards conceiving units of external force to be identical with units of feeling, than we can towards conceiving units of feeling to be identical with units of external force. Clearly, if units of external force are regarded as absolutely unknown and unknowable, then to translate units of feeling into them is to translate the known into the unknown, which is absurd. And if they are what they are supposed to be by those who identify them with their symbols, then the difficulty of translating units of feeling into them is insurmountable: if Force as it objectively exists is absolutely alien in nature from that which exists subjectively as Feeling, then the transformation of Force into Feeling is unthinkable. Either way, therefore, it is impossible to interpret inner existence in terms of outer existence. But if, on the other hand, units of Force as they exist objectively, are essentially the same in nature with those manifested subjectively as units of Feeling; then a conceivable hypothesis remains open. Every element of that aggregate of activities constituting a consciousness, is known as belonging to consciousness only by its cohesion with the rest. Beyond the limits of this coherent aggregate of activities, exist activities quite independent of it, and which cannot be brought into it. We may imagine, then, that by their exclusion from the circumscribed activities constituting consciousness, these outer activities, though of the same intrinsic nature, become antithetically opposed in [illegible]. Being disconnected from consciousness, or cut off by its limits, they are thereby rendered foreign to it. Not being incorporated with its activities, or linked with these as they are with one another, consciousness cannot, as it were, run through them; and so they come to be figured as unconscious—are symbolized as having the nature called material as opposed to that called spiritual. While, however, it thus seems an imaginable possibility that units of external Force may be identical in nature with units of the force known as Feeling, yet we cannot by so representing them get any nearer to a comprehension of external Force. For even supposing all forms of Mind to be composed of homogeneous units of feeling variously aggregated, the resolution of them into such units leaves us as unable as before to think of the substance of Mind as it exists in such units; and thus, even could we really figure to ourselves all units of external Force as being essentially like units of the force known as Feeling, and as so constituting a universal sentiency, we should be as far as ever from forming a conception of that which is universally sentient."[1]

I do not know where we could find anything more admirable than this lucid statement, in which the most subtle conclusion now within the ken of the scientific speculator is reached without disregard of the canons prescribed by the doctrine of relativity. From this masterly statement it appears that while the Inscrutable Power manifested in the world of phenomena cannot possibly be regarded as quasi-material in its nature, it may nevertheless be possibly regarded as quasi-psychical. Were we compelled to choose between these two alternatives, the latter would be the one which we must perforce adopt. For besides the general reason here indicated for such preference, there would in such case be presented the more special reason, that upon no imaginable hypothesis of evolution (if the foregoing analysis be correct) can units of Mind be regarded as produced by the collocations of units of Matter. Were we constrained to such a treatment of the subject, we should be forced to admit that the actual existence of psychical energy, as a phenomenon essentially distinct from physical energy, implies, as its antecedent source, something quasi-psychical in the constitution of things.

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[1] Spencer, *Principles of Psychol.* [illegible]

A third alternative, however, remains open. Since we know nothing even of Mind, save as qualitatively differentiated from Matter, under the persistent conditions by which conscious activity is limited, it is open to us to maintain that the Unknown Reality which is manifested under both aspects cannot legitimately be formulated in terms of either aspect. The unconditioned Source of the phenomena which we distinguish as psychical, and of the phenomena which we distinguish as material, may well be neither quasi-psychical nor quasi-material. Whichever set of terms we use, we are using symbols the values of which are determined by our experiences of conditioned existence, and which must therefore be totally inadequate to express the characteristics of unconditioned existence. Nevertheless, in so far as the exigencies of finite thinking require us to symbolize the Infinite Power manifested in the world of phenomena, we are clearly bound to symbolize it as quasi-psychical, rather than as quasi-material. Provided we bear in mind the symbolic character of our words, we may say that "God is Spirit," though we may not say, in the materialistic sense, that "God is Force." Such an utterance is, indeed, anthropomorphic. But we are now finding powerful confirmation of the argument elaborated in our Prolegomena, that a Positive mode of philosophizing is impracticable, and that we can never get entirely rid of all traces of anthropomorphism.[1] As formerly shown, "there is anthropomorphism even in speaking of the unknown Cause as a *Power* manifested in phenomena;" and if this expression is liable to be honestly misinterpreted as implying the identification of Deity with so-called "blind force," and as thus conveying a lower conception than that upon which theology insists, then we need not shrink from the scarcely-greater anthropomorphism involved in speaking of the unknown Cause as a Power manifested in phenomena. Such a choice of symbols will at least serve to show that we no more identify Deity with "blind force" than we identify Mind with "brute matter," or a psychical shock with a physical pulsation, and that, in our innermost intent, we are striving to convey a higher conception than that upon which theology insists.

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[1] See above, vol. i. p. 183.

But in thus consenting to adopt a term about which quasi-psychical connotations have clustered, we do not implicitly consent to the clothing of Deity with definable psychical attributes. The moment we use the words "intelligence" and "volition," we are using words which have distinct meanings as descriptive of certain circumscribed modes of psychical activity in man and some other animals. Except as descriptive of these circumscribed modes of psychical activity, they have no meanings whatever: and to seek to apply them to the unlimited activity (whether quasi-psychical or not) of a Being that is not circumscribed by an "objective datum," [illegible] is simply to call into existence a number of illegitimate propositions which, if dealt with as legitimate, would entangle us once more in the net-work of absurdities from which we were set free by the chapter on Anthropomorphic Theism.

Thus we are gradually finding ourselves obliged to regard the suggestion with which we ended the chapter just mentioned as something more than a mere random suggestion. Whether it be true or not that, within the bounds of the phenomenal universe the highest type of existence is that which we know as Humanity, the conclusion is in every way forced upon us that, quite independently of limiting conditions in space or time, there is a [illegible] Being which can neither be assimilated to Humanity nor to any lower type of existence. We have no alternative, therefore, but to regard it as higher than Humanity, even "as the heavens are higher than the earth;" and, except for the intellectual arrogance which the arguments of theologians show lurking beneath their expressions of humility, there is no reason why this admission should not be made unreservedly, without the anthropomorphic qualifications by which its effect is commonly nullified. The time is surely coming when the slowness of men in accepting such a conclusion will be marvelled at, and when the very inadequacy of human language to express Divinity will be regarded as a reason for deeper faith and more solemn adoration.

CHAPTER V.

RELIGION AS ADJUSTMENT.

FROM this abstract exposition of Cosmic Theism as a religious doctrine, let us now proceed to consider some of the practical relations of Cosmic Theism to human life, with especial reference to conduct, which, as Matthew Arnold well says, makes up in importance at least seven-eighths of life. As every system of religion has comprised, on the one hand, a theory of the world, and on the other hand, a code enjoining certain kinds of human conduct, and as we have thus far expounded Cosmism as a theory of the world, what is now to be said of the relations of Cosmism to human conduct? Or, in other words, does the enlargement of our conceptions of Divine action, in conformity with the requirements of contemporary knowledge, involve any radical alteration of the fundamental principles of action in which Religion, viewed practically, consists?

The position is often taken, by those who dissent from current ecclesiastical creeds, that there is no reason in the nature of things why the long-established association between religion and ethics should be continued,—and to these the following inquiry will perhaps seem uncalled for. It is urged, with justice, that conduct is not necessarily dependent on creed that equal uprightness may coexist with belief in doctrines diametrically opposite, that, in point of fact, the atheist usually leads quite as pure and holy a life as the Christian; and moreover, that it is possible to construct, out of scientific materials solely, an ethical code even more complete than any of those now generally accepted and practised. It would be useless to deny the force of these arguments. Not only is it true that science can furnish the inquirer with adequate principles of right action, but it is also true that, even without any very elaborate or thoroughly understood ethical code, the heterodox inquirer is, on the average, quite as likely to live rightly as the orthodox believer, since our characters depend far more upon our feelings which are inherited than upon the doctrines which are taught us. But, while admitting all this, it must still be claimed that the time-honoured association of religion with morality is not arbitrary but founded in the nature of things, and that it will accordingly continue in the future. The arguments just stated present but one side of the case. For while it is quite true that character is not a product of belief, it is no less true that action is influenced by belief. While observation shows that theological scepticism does not exert a deteriorating influence upon character, it cannot be doubted that ethical scepticism, could it become dominant, would confuse and obscure the incentives which prompt us to actions in harmony with the environment, and deter us from mal-adjustments. Practically the momentum of inherited impulse and bequeathed ethical tradition is so powerful that the cases in which theological scepticism has entailed permanently-effective ethical scepticism have been the exception rather than the rule. But what now concerns us is the inquiry whether in the nature of things a substitution of scientific for theological symbols involves an alteration of ethical values in the grand equation between duty and action. We shall find that no such change is involved in the substitution. Though we may, and do, throw overboard the whole of the semi-barbaric mythology in which Christianity has hitherto been symbolised, we shall find, nevertheless, that we have kept firmly in our possession the ethical kernel for which Christianity is chiefly valued even by those who retain the whole of this mythology.

If we inquire into the position which every theological creed has occupied with reference to the ethical code by which it has been supplemented, we shall find that in every case it has served to supply a powerful *sanction* to the principles of right action contained in the ethical code. That "thy days may be long in the land which Jehovah thy God giveth thee," or that "thy Father which seeth in secret may reward thee openly," *therefore* must thou do these things written in the law. Along with the moral code, embodying the principles of right action recognized by the community, there has ever been declared some theory of the relations of man to the unknowable Power manifested in the Cosmos, which has furnished incentives to the actions regarded as right and deterrents from the actions regarded as wrong. It is because religion has ever furnished this weighty sanction to morality that creeds and conduct have always been associated in men's minds; and it is because of this that narrow-minded theologians, unable or unwilling to admit that there can be any other adequate sanctions than those supplied by their own creed, so persistently argue upon the assumption that those who do not accept their creed must of necessity be morally perverse. We need not for the moment inquire into the moral value of the sanctions established by the various historic religions: whether they appeal to the purest and highest of human feelings or not, the essential point which now concerns us is the existence of such sanctions as an indispensable part of every religious system.

What, now, are the ethical sanctions recognized by science, and by that religious doctrine which I have here proposed to designate as Cosmic Theism? In what sense does a scientific philosophy hold to the distinction between sin on the one hand, and crime or tort on the other? Our questions may readily be answered if, bearing in mind the theoretic attitude of Cosmism toward Anthropomorphism, we note the anthropomorphic theory of sin and the anthropomorphic sanctions for righteousness. On the anthropomorphic hypothesis, sin is an offence against a personal Deity, consisting in the disobedient transgression of some one of his revealed edicts, and calling for punishment either in the present or in a future life, unless reparation be made by repentance or sacrifice. Now the theory of the Cosmist is in substance quite identical with this,[1] though expressed by means of very different verbal symbols. From the scientific point of view, sin is a wilful violation of a law of nature, or—to speak in terms of the theory of evolution—it is a course of thought or action, wilfully pursued, which tends to throw the individual out of balance with his environment, and thus to detract from his physical or moral completeness of life. The seeking after righteousness is characteristic of the modern follower of science quite as much as it was characteristic of the mediæval saint; save that while the latter symbolized his yearning as a desire to become like his highest concrete conception of human excellence ideally embodied in Christ, the former no longer employs any such anthropomorphic symbol, but formulates his feeling in scientific phrase as the persistent desire to live rightly, or in entire conformity to the requirements of nature,—as Goethe expresses it,—

> "Im Ganzen, Guten, Wahren, resolut zu leben."

The feeling is identical in the two cases, though the difference in the technical expression of it is as great as the difference between the theology of the "Imitation" and the science of "First Principles." Now when a law of nature has been violated (to use the current phrase), the religion of the scientific inquirer tells him that a sin has been committed; and he is smitten with a sense of self-reproach no whit less keen than that experienced by his mediæval predecessor. The distinction between the scientific and the religious view of the breach of law is thus apparent. When an act has been committed which must entail more or less misery either upon the individual himself or upon others, science merely recognizes that there has been a breach of law; but religion further declares that sin has been done, and there ensues a painful state of consciousness which, as we must carefully note, is not due to selfish dread of suffering to be encountered (since similar suffering in a righteous cause would be met with a feeling of self-approval), but is made up chiefly of self-condemnation for the inexcusable infraction of nature's ordinance. Regarded as a product of psychical evolution, this sense of sin, peculiar to the most highly developed organisms, is the analogue of the sense of pain shared in some degree by all organisms endowed with consciousness. The sense of sin, like the sense of pain, is normally the deterrent from actions which tend to diminish the completeness of the correspondence in which life consists. But while the sense of pain is common to those creatures whose incentives to action are purely selfish, the sense of sin can be possessed only by those creatures whose intelligence is sufficiently complex to enable them to recognize the relationship in which they stand to the omnipresent Power, and whose highest incentives to action are therefore quite impersonal. To feel the sting of self-reproach because of wrong-doing, without any selfish reference to the misery which the wrong-doing must inevitably entail, is the high prerogative of that creature whose future career of [illegible] as we have seen, must mainly consist in spiritual improvement,—and in it we may recognize the sure token of the glorious fulness of life to which Humanity must eventually attain.

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[1] Saving only the last clause. For, as we shall presently see, science knows of no such thing as reparation for sin. Repentance cannot ward off punishment. And herein the Cosmic hypothesis is as far superior to the Anthropomorphic hypothesis from the ethical, as it is from the philosophical, point of view.

Such is the crude outline of the theory of sin, and of the ethical sanctions furnished by religion, into which Cosmism metamorphoses the anthropomorphic theory. Far from rejecting as a mythologic fiction the doctrine that sin is a violation of God's decrees, entailing inevitable punishment, science recognizes therein the anthropomorphic version of the truth that every failure in the system of adjustments in which life consists is followed inevitably by pain, in some one of its lower or higher forms. And thus, by bringing the whole subject into the philosophic domain wherein the Law of Evolution holds sway, we begin to understand, so far as it is possible to understand, the philosophy of evil, pain, and wrong, which to the anthropomorphic theist, as we have seen, must ever remain a distressing and insoluble enigma. Let us briefly trace the process by which men have slowly arrived at the perception of the beneficence of pain, that we may the more clearly see how the process has been determined by the deanthropomorphization of the agencies by which pain is wrought.

In treating of the philosophy of fetishism (Part I. chap. vii.) it was shown that by primeval men, unused to scientific generalization, the forces of nature must have been likened to human volition, because there was nothing else with which to compare them. Man felt within himself a source of power, and did not yet surmise that power could have any other source; and consequently he identified, without any qualification, the forces displayed outside of himself with the force of will as directly revealed in his consciousness. In this necessity of thought originated not only the personifications of ancient mythology, but also the primitive religious worship; a religion of sacrifice, of sorcery, and of terror, as different [illegible] religion or mythology is different from modern [illegible]. In primitive religion the most prominent, as well as the most enduring, phase is devil-worship. Mr. Hunter's remarks concerning the Santals will apply equally well to [illegible] all over the world, as also to the primeval men from whose crude notions modern orthodoxy has inherited [illegible]. "Of a supreme and beneficent God the Santal has no conception. . . . He cannot understand how a Being can be more powerful than himself without wishing to hurt him. Discourses upon the attributes of the Deity [illegible] an emotion among the more isolated sections of the race except a disposition to run away and hide themselves in the jungle. The only reply made to a missionary at the end of an eloquent description of the omnipotence of God, was, 'But what if that Strong One should eat me?' [illegible] altogether the Santal has no God from whose benignity he may expect favour; there exist a multitude of demons and evil spirits whose spite he endeavours by supplications to avert. So far from being without a religion, his rites are infinitely more numerous than those of the Hindu."[1] The genesis of this primitive devil-worship finds its explanation in the fact that the uncontrollable agencies of nature—the storm and the earthquake, the wind and the waves—though supposed to resemble man in so far as they were intelligent and volitional agents, could not be wholly like him. Their ways were not as his ways. They were not to be counted upon. They could not be prepared for, provided against, or reasoned with. They might bring harm; and frequently they did bring harm. Accordingly they were regarded with fear and trembling. It is not easy for us to realize the extent to which in early times the unknown was identified with the harmful.[2] It is not possible for us adequately to represent in imagination the overpowering emotions of mingled doubt and dread which must have seized the primitive thinker when brought face to face with this omnipresent, but to him utterly incoherent, universe. Where certainty is for us, for him was uncertainty. The same resistless forces which to us bring expected benefits were for him productive mainly of unlooked-for calamities. We, holding in our grasp the Aladdin's lamp of physical knowledge, may find them obedient slaves: to him, who had not unearthed the talisman, they proclaimed themselves inexorable masters. Hunger and disease, exposure to heat and cold, to the attacks of savage beasts and of unseen enemies, were stern realities of daily experience. There were neither houses for shelter and defence, nor cities for the common protection, nor arts to insure exemption from physical discomfort. Language had not yet found need for words to denote some of the most necessary implements and some of the most ordinary processes of life. Nature was unmanageable as well as unknown,—a stumbling-block as well as a riddle.

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[1] [illegible]

[2] [illegible] long-enduring effects of this primi- [illegible] Natur des Menschen, in einer

Thus the unclassed phenomenon came to be a source of terror; for experience had taught that it was quite as likely to bring disaster as good fortune. Thus the volitional agencies by which fetishism sought to account for surrounding phenomena came to be regarded as capricious and malevolent agencies, whose wrath must be averted by prayer or sorcery, and whose favour must be bought by sacrifice. Thus arose the conception of God as a consuming fire. Thus it was that in Egypt deprecating prayers were addressed to the crocodile, and in Syria to the serpent; that Hindu mothers threw their children into the Ganges, while Carthaginians burned their new-born infants in front of the brazen image of Moloch.

ernsterfüllten Ansicht der Dinge, dass das Unerwartete, Ausserordentliche, nur Furcht, nicht Freude oder Hoffnung erregt." *Kosmos*, tom. i. p. 119.

This sense of a Satanic presence in nature, whether embodied in the form of a malevolent devil or in that of a ferocious deity, ever ready to burst forth with fire and consume his creatures, has been of long continuance. It lies at the bottom of mediæval witchcraft, and it shows itself in the modern "revival-meetings" in which the religious theories of uneducated people still betray their close kinship with those of the savage. From the educated portion of the community, however, it has entirely disappeared; and its disappearance is manifestly due to that part of their education which has consisted in the scientific generalization of natural agencies, and in the consequent deanthropomorphization of their conceptions of force. We have seen that, with the progress of generalization, the conception of volition is gradually excluded from all those groups of phenomena in the production of which the human will is not implicated, and is replaced by the conception of a uniform force, whose actions may be foreseen or modified, and whose effects, if harmful, may be avoided. Our ability to predict the simpler phenomena of nature has deprived them of the terrors due primitively to our anthropomorphic explanations of them. Armies retreating from destruction—like that of Nikias—have never been checked in their course by eclipses which had been foreseen; and comets have been beheld with equanimity since they have been known to move in conic sections. But coincident with the progress of our ability to predict these simpler phenomena, has been the progress of our ability to modify those which are more complicated. The advancement of science is also the advancement of art. Penetrating inquisitively into the secrets of Nature, we employ our information in extorting from her her treasures. Fire is not the only bad master that we have contrived to make a very good servant. We transform heat into motion, and improve our means for travelling. We change electricity into motion, and facilitate the transfer of intelligence. The agencies which produce small-pox we compel to defeat themselves. And thus, in many ways, we extract profit and gratification from that which is ugly and noxious; as the refuse of gas-works and the drainings of stables, when dealt with by the chemist, yield rich dyes and delicate perfumes.

Thus, as science advances, Nature is better understood. As art progresses, she inflicts less pain and bestows more pleasure. Once hated as an enemy, she is at last revered as a benefactor. Gradually it comes to be perceived that all pain arises from disregard of her wisely-framed ordinances; and that, by conformity to those ordinances, pain may ultimately be avoided. Where the ancient man saw nothing but capricious volition, the modern man beholds force acting by invariable methods. The former knew not that the pain under which he was writhing resulted from a violation of Nature's edicts, and he sought to prevent its recurrence by sacrifice and supplication. The latter knows that Nature's commandments are not to be broken. He knows that to their infringement there is attached an inevitable penalty,—that misery will follow disobedience, the first time, the second time, every time; and he therefore learns to obey. Matter does not put off its resistance to save from broken bones; the stomach does not stop digesting, that poison may be innocuous; the law which couples imprudent exposure with bronchitis and pneumonia will not cease to operate, though thousands die; nerve-tissue will not renounce its properties, to prevent indulgence in evil thoughts and yielding to sinful inclinations from depraving the imagination and weakening the will. To be delivered from evil, we must avoid the mal-adjustments of which evil is the consequence and the symptom. Hence, while to the aboriginal man malevolence was the only conceivable source of suffering, the reverent follower of science perceives the truth of the paradox that the infliction of pain is subservient to a beneficent end. "Pervading all nature, he sees at work a stern discipline, which is a little cruel, that it may be very kind." That perpetual warfare going on throughout the animal world, whereby those no longer fit to live are spared the miseries of protracted existence, is found to be also the indispensable condition of the origination of higher forms of life. The disappearance of savage tribes before the spread of civilized races, while often accompanied by unjustifiable aggression on the part of the stronger, is perceived to involve the increase of the sum-total of happiness. Thus, with Michelet, we come to regard pain as in some sort the artist of the world, which fashions us with the fine edge of a pitiless chisel, cutting away the ill-adjusted and leaving the nobler type to inherit the earth.[1]

But note that such a solution of the mystery of pain is attainable only by the complete elimination of anthropomorphism from the problem. Introduce a quasi-human will behind the series of phenomena, and we are at once confronted anew with all the difficulties mentioned in the chapter on Anthropomorphic Theism. The fact stands inexorably before us, that a Supreme Will, enlightened by perfect intelligence and possessed of infinite power, might differently have fashioned the universe, though in ways inconceivable by us, so that the suffering and the waste of life which characterize nature's process of evolution might have been avoided. It may be said that such a supposition is sheer nonsense,—since we must accept, as a pre-requisite for all speculation on the subject, the properties of matter and motion as we find them, necessitating as they do the process of evolution as we observe it. But to say this is to concede all that is here maintained, and implicitly to admit that, instead of postulating a quasi-human Will as the source of phenomena, we must rest content with the recognition of an Inscrutable Power, of which the properties of matter and motion, necessitating the process of evolution, with pain and wrong as its concomitants, are the phenomenal manifestations.

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[1] "La douleur est en quelque sorte l'artiste du monde, qui nous fait, nous façonne, nous sculpte à la fine pointe d'un impitoyable ciseau. Elle retranche la vie débordante. Et ce qui reste, plus exquis et plus fort, enrichi de sa perte même, en tire le don d'une vie supérieure." Michelet, *L'Oiseau*, p. 106. Compare the sublime passage concerning man, wherein Tennyson says:—

"If so he type this work of Time

"Within himself from more to more;
And, crowned with attributes of woe
Like glories, move his course, and show
That life is not as idle ore;

"But iron dug from central gloom,
And heated hot with burning fears,
And dipped in baths of hissing tears,
And battered with the shocks of doom,

"*To shape and use.*"

With the entire elimination of anthropomorphism, the conception of malevolence as the source of suffering completely vanishes, and the mind assumes an attitude of reverent resignation with reference to the workings of Divine power. Even such a catastrophe as the Lisbon earthquake, which so sorely puzzled the aged Voltaire and the youthful Goethe, lost its worst horrors when geology, discarding mythological explanations, referred it to the action of those same subterranean energies which are ever maintaining the earth in a habitable condition. The scientific inquirer must needs recognize the fact that physical forces will work their normal effects, though the result be the sending of rain alike upon the just and upon the unjust. The expansive energy of steam will slay not only the wicked engineer who has neglected his boiler, but also the innocent children peacefully playing on the deck overhead.

"Streams will not curb their pride,
  The just man not to entomb,
Nor lightnings go aside
  To leave his virtues room."

But the flood and the earthquake, like the wickedness of men, in so far as the arrangements of society are not yet [illegible] [illegible] suffering it must be accepted with resignation as part and parcel of the events which the constitution of our universe necessitates. Such evils, which right living will not guard against, furnish no excuse for ceasing to shun the commission of wilful wrongs which detract, to a far greater extent, from the fulness of life of ourselves and our fellow-creatures. The sanction by which the religion of the scientific inquirer enforces its ethical code, is the certainty that mal-adjustment will be followed, always by the suffering or degradation of the wrong-doer himself, and usually by the suffering of others who are innocent. And while in this respect there is no essential difference between the Cosmic and the Anthropomorphic theories, on their ethical sides, there is another respect in which the sanction recognized by the former is far more powerful, and must in time become far more effective, than the sanction recognized by the latter. For the current anthropomorphism, in this as in other points betraying its kinship to primeval fetishism, asserts that by repentance and prayer the evil effects of sin may be avoided. The anthropomorphic theist sees in his Deity a being so nearly like himself as to be willing to interfere with the ordinary course of things and dissociate the act of wrong-doing from its legitimate penalty. As the father puts forth his arm and saves his falling child from the natural consequences of a false step, so it is supposed that God will, in certain cases, turn aside the blow which nature has in store for human misdeeds. Science knows of no such interference with the law that pain is consequent upon mal-adjustment. The deed once done will work its full effects, save in so far as checked by counter-actions. He who has swallowed arsenic will be saved not by prayer, but by an emetic. He who has yielded to temptation may indeed, by the repentant feeling of which prayer is the expression, secure himself from future yielding; but the tendency toward loss of self-control, initiated by the first surrender, cannot be rendered non-existent by any *ex post facto* act of contrition, though its operation may be counteracted. And if the misdeed, as usually happens, has involved others than the agent, its evil consequences must endure and ramify, until they at last disappear through some natural process of equilibration. No amount of repentance for lying can deprive lies of their tendency to weaken the mutual confidence of men and thus to dissolve society. The lie once told must work its effects, as surely as the stone dropped into water must give forth its arrested motion in rippling circles. No penance or priestly absolution can do away with the persistence of force.

Obedience to the so-called "laws of nature," which are the decrees of God, is therefore the fundamental principle of religion viewed practically. And, as was hinted at the close of the twenty-second chapter of Part II., religion, as thus interpreted, has a wider meaning than morality. For, as we saw, in the chapter referred to, that a philosophy of hedonism has for its subject-matter the principles of action conducive to the right living of the individual so far as his own happiness is concerned, and that a philosophy of morality has for its subject-matter the principles of action conducive to the right living of the individual so far as the well-being of the community is concerned; so a philosophy of religion has for its subject-matter the relations of the individual to the Inscrutable Power manifested in the universe, and the principles of action conducive to his right living considered as a part and parcel of the universe. To live in conformity to Nature's decrees, is to live morally, in the common acceptation of that term, and something more beside. For there are many actions which, as immediately concerning none but the individual, are technically neither moral nor immoral, but which nevertheless are right or wrong. Over-eating, for example, which can hardly be termed immoral, and which the current hedonism mildly characterizes as imprudent, may from a religious point of view be regarded as wrong or sinful. I cite this homely illustration because it leads directly to the pith and centre of the truth which I am seeking to explain. Hedonism, of which the highest principle of action is personal selfishness, regards the individual as having a right to do what he likes with his own body. Religion declares that he has no such right, but on the other hand has duties toward himself which he is as much bound to discharge as if they directly concerned other people. Religion, therefore, extends the rules of right and wrong primarily derived from the relations of the individual to the community, until they cover even the self-regarding actions of the individual. And what is this but establishing rules of action concerning the individual in his relations to what we call Nature or the Universe? Finally, as the organized moral sense takes cognizance of actions injurious to the community, visiting them with the stings of self-reproach without any direct or conscious tracing out of their probable injurious consequences; so the religious sense takes cognizance of all actions whatsoever which come within the class of mal-adjustments, whether they directly concern the community or not, and the feeling of self-condemnation arises irrespective of any direct estimate of probable consequences. For the religious sense is primarily based upon the aspiration—the noblest which any creature can entertain—after complete fulness of life; and any thought or act, any sin of omission or of commission, inconsistent with such aspiration, awakens the painful consciousness of shortcoming, without any reference to those lower considerations of pleasure and pain of which alone hedonism takes cognizance.

Such, in brief outline, is the theory of religion which seems to me most thoroughly consonant with our present knowledge. Scanty justice can be done, in one short chapter, to so great a subject. But a detailed exposition would not be in keeping with the purpose of the present work. It is not my aim to propound a complete theory of religion, or to prepare the way for the inauguration of any new religious system—for I should regard any undertaking of this kind as *ab initio* self-convicted of absurdity—but simply to show that it is in the power of Science, without proving recreant to its own methods, to maintain every one of the fundamental truths which give to Religion its permanent value. Starting from the knowledge of nature which we now possess, and without making appeal to venerated traditions based upon the scantier knowledge possessed by relatively barbarous ages, I have sought to show that the truths already discerned and asserted in these traditions—the fundamental truths to which alone the traditions owe their permanent hold upon men's minds—are in nowise shaken, but rather confirmed and reiterated by our present knowledge. For my purpose, this has been sufficiently shown in the present chapter and its two predecessors. For not only have we seen that scientific inquiry, proceeding from its own resources and borrowing no hints from theology, leads to the conclusion that the universe is the manifestation of a Divine Power that is in no wise identifiable with the universe, or interpretable in terms of "blind force" or of any other phenomenal manifestation; but we have also seen that the ethical relations in which man stands with reference to this Divine Power are substantially the same, whether described in terms of modern science or in terms of ancient mythology. And in so far as there is any difference between the scientific and the mythologic view of the sanctions by which these ethical relations are maintained, we have seen that the sanctions recognized by the former are even more powerful than those recognized by the latter. While, lastly, as regards the basis of these ethical relations, the superiority of the scientific view is most conspicuously manifest. Far from its being true, as Mr. Mivart seems to fear, that the

Granting that our doctrine is philosophically the reverse of atheism, it will be urged that here extremes meet, and that an infinite and therefore unknowable God is practically equivalent to no God at all.

In reply to the latter objection it is hardly necessary again to remind the objector that upon similar grounds, and with equal plausibility, the early Christians were called atheists by their pagan adversaries. The reproach of atheism has been well defined, by Mr. R. W. Mackay, to be the reproach which the adherents of a lower creed endeavour to cast upon those of a higher one. The less anthropomorphic the symbol by which Deity is represented, the less readily imaginable it is as something which can be seen, or heard, or prayed to, the less existent does it appear. And as we proceed to take away, one by one, the attributes which limit Deity, and enable it to be classified, we seem, no doubt, to be gradually destroying it altogether. Nevertheless, to him who has thus far intelligently followed this exposition, it will not be necessary to demonstrate that the symbolization of Deity indicated by the profoundest scientific analysis of to-day is as practically real as the symbolization which has resulted from the attempts of antiquity to perform such an analysis, and is in every way more satisfactory alike to head and heart. To him the most refined anthropomorphism to be met with in current theological treatises will no doubt seem as unsatisfactory as the anthropomorphism of orthodox "revivalists" must seem to Mr. Hutton or Mr. Martineau.

Indeed there are few philosophical terms which have more thoroughly brought out the inveterate tendency of men to mistake the counters of thought for its hard money than this term "Unknowable." Alike from Idealists and Positivists, from theologians of every school and from penny-a-liners of no school, we hear long arguments based upon the vague connotations which the word "Unknowable" calls up, without any reference to the precise sense in which the symbol is used in Mr. Spencer's philosophy,—nay, without even a suspicion that the symbol may have a precise value in some measure purified from such connotations. At this stage of our exposition, it is enough to suggest the fallaciousness of such argumentation, without characterizing it in detail. It is enough to remind the reader that Deity is unknowable just in so far as it is not manifested to consciousness through the phenomenal world,—knowable just in so far as it is thus manifested; unknowable in so far as infinite and absolute,—knowable in the order of its phenomenal manifestations; knowable in a symbolic way, as the Power which is disclosed in every throb of the mighty rhythmic life of the universe; knowable as the eternal Source of a Moral Law which is implicated with each action of our lives, and in obedience to which lies our only guaranty of the happiness which is incorruptible, and which neither inevitable misfortune nor unmerited obloquy can take away. Thus, though we may not by searching find out God, though we may not compass infinitude or attain to absolute knowledge, we may at least know all that it concerns us to know, as intelligent and responsible beings.[1] They who seek to know more than this, to transcend the conditions under which alone is knowledge possible, are in Goethe's profound language, as wise as little children who, when they have looked into a mirror, turn it around to see what is behind it.

To the other objection above hinted at it may be replied that undoubtedly the conception of sin here developed is too abstract to awaken the needful feelings in any save those who have obtained, either through their own inquiries or by the aid of instruction from others, a firm grasp of some philosophic theory of the universe like the one crudely sketched in the present work. For the larger part of the world to-day the anthropomorphic doctrine of sin is unquestionably the better one,—and it is [illegible] held by the larger part of the world. If it were possible for men to come by the thousand, as on a second day of Pentecost, and embrace the views here expounded, or others like them, without having slowly and surely grown to them, there would be great risk of their going away with a frail and unserviceable religious theory. But as it is absolutely certain that such views will never become prevalent until the scientific philosophy upon which they are based has become generally understood and accepted, and as by that time they will necessarily have come to appear quite substantial and practical, there appears to be but little weight in the objection referred to.

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[1] See above, v [illegible]

Indeed, as the next chapter will plainly show, nothing can be farther from the intentions of the scientific thinker than the demand that contemporary society shall give up any of the religious doctrines with which it is able to rest contented, in exchange for doctrines which to all minds save those sufficiently instructed in science are likely to seem shadowy and over-subtle. Far from proposing to institute a new religion which, like Islam, is to overrun the world and wrench all men suddenly from their idols, our aim is simply to point out some of the more important modifications which current religious doctrines seem destined to undergo in becoming accepted and assimilated by thinkers whose theories of things are based wholly upon irrefragable scientific truths. That the Doctrine of Evolution, which is now the possession of a few disciplined minds, will eventually become the common property of the whole civilized portion of the human race, is, to say the least, very highly probable. In view of this probability, it seems to me a worthy end for our philosophic inquiry, if we can ascertain that, in spite of the total change in the symbols by which religious faith finds its expression, nevertheless the religious attitude of mankind will remain, in all essential respects, unchanged. I shall endeavour to show, therefore, in the following chapter, that with reference to the fundamental truths of Christianity, and likewise with reference to the time-honoured institutions which are woven into the fabric of modern society, our Christian Philosophy is eminently conservative,—owning no fellowship either with the radical Infidelity of the eighteenth century or with the world-mending schemes of Positivism.

CHAPTER VI.

THE CRITICAL ATTITUDE OF PHILOSOPHY.

OUR outline-sketch of the Cosmic Philosophy based on the Doctrine of Evolution would remain seriously defective without some account of its critical bearing with reference to past and present religious beliefs and social institutions. Since the reception of a number of definite opinions concerning man in his relations to the universe and to his fellow-creatures must leave their possessor in a certain characteristic attitude,—aggressive or sympathetic, iconoclastic or conservative,—toward the multitude of opposite or conflicting opinions by which he is surrounded, it becomes desirable for us to ascertain whether the critical temper of our Cosmic Philosophy tends toward the subversion or the conservation of that complex aggregate of beliefs and ordinances which make up the social order amid which we live. Our object will be best attained, and our results will be most clearly presented, if we begin by considering some of the philosophic contrasts between the statical and dynamical habits of thinking, to which attention was called in an earlier chapter.

A statical view of things, as I have above defined it, is which is adjusted solely or chiefly to relations existing in immediate environment of the thinker. Certain groups of physical phenomena, certain psychical prejudices, certain social customs, having existed with tolerable uniformity over a limited portion of the earth's surface, it is assumed either that the given phenomena have always existed, or at least that they enter by divine pre-arrangement into the eternal order of things in such a way that any thorough-going alteration of them must involve universal anarchy and ruin. The fundamental doctrine of the philosophy which is determined by this statical habit of interpreting phenomena, is the Doctrine of Creation. The world is supposed to have been suddenly brought into existence at some assignable epoch, since which time it has remained substantially unaltered. Existing races of sentient creatures are held to have been created by a miraculous fiat in accordance with sundry organic types which, as representing unchangeable ideas in the Divine Mind, can never be altered by physical circumstances. The social institutions also, amid which the particular statical theory originates, are either referred back to the foundation of the world, as is the case in early and barbaric mythologies; or else, as is the case with modern uneducated Christians, they are supposed to have been introduced by miracle at a definite era of history. In similar wise the existing order of things is legitimately to endure until abruptly terminated by the direct intervention of an extra-cosmic Power endowed with the anthropomorphic attributes of cherishing intentions and of acting out its good pleasure. Facts of palæontology, such as the extinction of myriads of ancient animal and vegetal species, are explained as the result of innumerable catastrophes determined by this same extra-cosmic Deity; and strange geologic phenomena are interpreted by the myth of a universal deluge which left them once for all just as we see them. Likewise the social institutions and the religious beliefs now existing by express divine sanction, must [illegible] tially unaltered under penalty of divine wrath [illegible] in the infliction upon society of the evils of atheism and anarchy. Hence, as the Doctrine of Creation is itself held to be one of these divinely-sanctioned religious beliefs, the scientific tendency to supersede this doctrine by the conception of God as manifested not in spasmodic acts of miracle, but in the gradual and orderly evolution of things, is stigmatized as an atheistical tendency, and the upholders of the new view are naturally enough accredited with a desire to subvert the foundations of religion and of good conduct. Hence it is that even such scientific writers as Mr. Mivart—unable to escape the evidence in favour of Evolution which is supplied by their own studies, yet somewhat desperately clinging to the philosophic views which are founded upon the Doctrine of Creation—are now and then guilty of remarks much better befitting ignorant priests than men who have lived in direct contact with modern scientific thought. That dominance of the statical habit of thinking, which leads Mr. Mivart to prefer the irregular action of "sudden jumps" to the slow but regular operation of natural selection, leads him also to assert that the Doctrine of Evolution, as consistently held by Prof. Huxley, tends toward the intellectual and moral degradation of mankind and toward the genesis of "horrors worse than those of the Parisian Commune!"[1]

Before proceeding to show how assertions of this sort are, from the evolutionist's point of view, as reckless and absurd as, from Mr. Mivart's point of view, they are justifiable and logical, let us note that the statical habit of thinking is by no means monopolized by the orthodox, or by those whose philosophic theories consist mainly of elements inherited from primeval mythology. The progress of scientific discovery since the time of Galileo and Bacon has but gradually, and as its newest result, established the Doctrine of Evolution; yet it has, from the very outset, assumed a hostile attitude toward the body of mythical conceptions of which the current Christian theologies have been largely made up. The consequence of this has been the rise of a purely negative iconoclastic style of criticism, both in religion and in politics, which, in spite of its deadly hostility to the prevailing orthodoxy, has nevertheless been equally characterized by theories and aims which are the products of the old statical habits of thought. While orthodoxy and its companion legitimism have regarded the existing religious and social order, not as a product of evolution, but as a divinely-appointed and therefore eternally sacred order of things; on the other hand iconoclasm, whether manifested in religion or in politics, has regarded the existing order of things, not as a product of evolution, but as the work of artful priests and legislators of antiquity, which may accordingly be destroyed as summarily as it was created. Even while justly inveighing, therefore, against patent absurdities or flagrant wrongs in the established order of things, the iconoclast proceeds from a point of view as untenable as that occupied by his orthodox antagonist. Rejecting the mythical conception of the established order as in any especial sense divinely-appointed, he nevertheless borrows from the old mythology its notion of cataclysms, and vainly imagines that beliefs and institutions which suit the intellectual and moral needs of half the world can be incontinently eradicated or overthrown by direct assaults from without. Reasoning, then, upon this inadequate basis, and being as incapable of appreciating sympathetically the beliefs of a bygone age as his orthodox opponent is incapable of emancipating himself from such beliefs, the controversy between the two becomes naturally barren of profit though fruitful in recrimination; and each regards the other with a dislike or a distrust which, though justifiable enough when considered from the points of view respectively occupied by the antagonists, nevertheless seems barbaric or childish to those who have reached a higher stand-point.

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[1] *Contemporary Review*, January 1872, p. 196.

This higher stand-point is furnished by what I have called the dynamical habit of looking at things as continually changing in a definite and irreversible order of sequence. That this habit should not have been acquired, save by two or three isolated minds, until the present century, is not to be wondered at, since for the full acquirement of it there is needed a familiarity with scientific conceptions of genesis which could not have been gained at any earlier date. But as soon as the tendency to contemplate all phenomena as the products of preceding phenomena has become fairly established, a marked change is noticeable in the current style of criticism. The comparative method is found to be as applicable to religious beliefs and social or political institutions as it is to placental mammals or to pluperfect tenses. And so the habit of regarding the existing order of things as on the one hand ordained of God or on the other hand maliciously contrived by the Devil gradually fades away, and is replaced by the habit of regarding it as evolved from some preceding order of things, and as in turn destined normally to evolve some future order. Hence the evolutionist perceives that it is not by mere controversial argument that mankind can be led to exchange the mythological for the scientific point of view. He regards the process as one, not of sudden conversion, but of slow growth, which can be accomplished only by the gradual acquirement of new habits of thought,—habits that are formed day by day and year by year, in the course of a long contact, whether immediate or not, with the results of scientific inquiry. Thus the evolutionist owns no fellowship with Jacobins and Infidels, for he has learned that engrained habits of thought and favourite theories of the world, being the products of circumstances, must be to a certain extent adapted to the circumstances amid which they exist; and he knows that they cannot be destroyed, and ought not to be destroyed, save as they are gradually supplanted by habits of thought that are relatively more accurate and by theories of the world that are relatively more complete.

In view of these considerations we may the better comprehend the significance—upon which I formerly (Part I. chap. vii. insisted—of the change in the attitude of philosophy of which Comte's celebrated doctrine of the "Three Stages" was partly the cause and partly the symptom. In spite of his hostility to the Doctrine of Evolution, in most of the forms in which he came into contact with it as technically stated, Comte was nevertheless thoroughly inspired by the comparative method, so far as the study of history was concerned. As far as was possible with his slender scientific resources, he looked at human affairs with the eye of an evolutionist. When he announced it as a law that every human conception must pass through three stages—the theological, the metaphysical, and the positive—though his statement was a crude one, it nevertheless clearly showed that a time had come when opinions were no longer to be tried by their conformity to some absolute standard, whether of orthodoxy or of radicalism, but were henceforth to be estimated in their relations to the circumstances which had given rise to them.

Those who have most carefully studied the iconoclastic philosophy of Voltaire and the *Encyclopédistes* of the eighteenth century, will best appreciate the character and extent of the revolution in the attitude of philosophy which was effected by this new method of criticism. In the opinion of those metaphysical thinkers, everything old was wrong, and anything new was likely to be right. They classified men, not relatively, as ancients, mediævals and moderns, but absolutely as fools and philosophers; the philosophers being all who subscribed to the doctrines of the *Encyclopédie*, the fools being all those who believed in miracles or in a [illegible]

So utterly destitute were they of that historic sense which enables the critic to enter into the spirit of the epoch which he is criticizing, that they could not interpret the mythology of antiquity and the theologic dogmas of the mediæval Church otherwise than as a set of ingenious devices contrived by priests and rulers for the ensnaring and subjugation of mankind. Perhaps nothing can better illustrate the barrenness of their point of view than their undiscriminating admiration for the emperor Julian, whose memory they exalted because of his attempt to stop the progress of Christianity; this being the very reason for which that monarch is now justly regarded as one of the most blindly retrograde statesmen that ever lived. Such was their criticism—a mere bald negation and disavowal of all that had preceded them. And such being their criticism, such also was their political philosophy—an unqualified protest, primarily against feudalism, monopoly and divine right, but ultimately, as carried out by Rousseau, against all constraint whatever of man by man, and therefore against the very constitution of society. The immortal pamphlet in which this greatest of sophists sought to demonstrate that all civilization, all science, and all speculative culture is but an error and a failure, and that the only remedy lies in a return to primitive barbarism,—was the legitimate outcome and *reductio ad absurdum* of a philosophy which began by forcibly severing itself from all historic sympathy with the time-hallowed traditions of our race.

Such a philosophy may end, as it has ended, in anarchy of thought, but not in rational conviction. It cannot organize a new framework of opinions, nor can it even thoroughly accomplish the task of destroying the old framework. It may indeed, as it has done here and there, knock the venerable edifice into unshapely ruin, but it cannot sweep away the cumbersome débris, and leave the ground clear for the erection of a new and more permanent structure. It discredits altogether too profoundly the earnest work of that

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cates of a cause, De Maistre under[illegible]k to

science and the group of philosophic notions to which its discoveries had given rise. According to him, Kant was an ignorant charlatan, Bacon an atheist in hypocritical disguise, and the so-called Baconian philosophy "a spiritless materialism," uncertain and unsteady in its expression, frivolous in tone, and full of fallacies in every assertion. In place of this "spiritless materialism" he would give us the full-blown Catholicism of the days of Hildebrand, every subsequent variation from which has, in his opinion, been due, not to disinterested seeking after higher truth, but to a madness of neologism, a diseased craving after new and strange devices.

In these interesting opinions—interesting because they come, not from a peevish and ignorant priest, but from a man of wide culture, worldly wisdom, and undoubted intellectual power—may be seen the violence of the reaction against that negative philosophy which, in its effort to break entirely with the past, had assisted in bringing about the speculative atheism and practical anarchy of 1793. We have now to note that, from the statical point of view which he occupied, De Maistre was perfectly right in regarding modern scientific thought as an enemy to society which must be put down at whatever cost. For as modern science had not yet reached that conception of gradual change which underlies the Doctrine of Evolution, while it had become distinctly conscious of its hostility to the current mythologies, it assumed the attitude of Atheism with reference to Christian theology and of Jacobinism with reference to the institutions of Christian society. Now it is perfectly true that the practical outcome of these kindred forms of iconoclasm, could they be allowed to have their way unhindered, would be the dissolution of society and the return to primeval barbarism. For since it is impossible for a given state of civilization to be made to order, even by the greatest political genius, or to be produced in any way save by evolution from an antecedent state, it follows that the dissolution of the social relations existing at any epoch would simply leave the work of civilization to be (at least, to a great extent) done over again. An instructive historical example of such a dissolution of social relations, partially effected, and of the consequent partial return toward barbarism, is to be found in the history of Romanized Europe from the fourth to the tenth centuries of the Christian era. And as this partial dissolution cannot be referred solely to the barbaric attacks from without—which during at least seven centuries had been steadily kept up without impairing the integrity of the Empire—it must be referred to causes operative within; to the demoralization consequent upon general scepticism as to the validity of the principles of action by which men had formerly been guided. Now the violent breaking up of the feudal and mediæval Christian system, which occurred during the last century, was attended by some of the same dangerous symptoms as those which marked the dissolution of ancient polytheism and ancient notions of civic patriotism; though in the modern case the succession of phenomena was more rapid, and there were no assaults from outside barbarism to complicate matters. We have lately remarked upon the curious phenomenon of a free-thinker, like Rousseau, openly advocating a return to barbarism, upon the ground—which admirably illustrates his statical view of things—that social relations were due to a primitive contract, from which the contracting parties might at any time withdraw. It is also worth noting that, under the practical application of Rousseau's doctrines by his apparently well-meaning but narrow-minded and fanatical disciple, Robespierre, the rejection of Christianity was followed by an act of adoration toward a courtesan which would have been more in keeping with early polytheistic ages, and the overthrow of feudal tyranny was followed by a mode of settling political questions such as is normally practised only among societies of primitive type. It is significant also, to the evolutionist, that this partial dissolution of social relations should have been followed by that disgraceful epoch in which principles of international equity worthy only of Attila or Genghis Khan were embodied in the barbarous ethical code of the First Empire.

A still more complete illustration of the tendency of pure iconoclasm toward social dissolution is to be found in certain radical theories concerning labour, property, and marriage, which have been current during the present century among people untrained in science and unfamiliar with the lessons of history, and which played their part in shaping the policy of the Parisian Commune of 1871. For the purposes of our inquiry it is not necessary for me to offer a matured judgment concerning this unfortunate historical transaction in all its actual complexity, even were I competent to do so. It is enough for us to remember that among those political leaders who sought to inaugurate the reign of the Commune, a considerable number professed to hold the doctrines commonly known as communistic, and that the social relations which they were intent upon establishing are precisely those which Sir Henry Maine has shown to have existed among primeval men, and which exist to-day among the lowest races. This desire to return to the community of property and of wives characteristic of primitive savagery, to regulate human concerns by *status* and not by contract, to crush out capital and with it the possibility of any industrial integration, to abolish the incentives which make man sow to-day that he may reap in the future, to destroy social differentiation by constraining all persons alike to manual labour, to strangle intellectual progress by permitting scientific inquiry only to such as might succeed in convincing a committee of ignorant workmen that their discoveries were likely to be practically useful, to smother all individualism under a social tyranny more absolute than the Hindu despotism of caste; this desire, it is obvious, is simply the abnormal desire to undo every one of the things in the doing of which we have seen that social evolution consists. It is, in short, the theory of Rousseau unflinchingly carried into details, though, in deference to the watchwords of the present age, it is couched in expressions which imply a sympathy with human progress.

For such abnormal phenomena as those of the Terror and the Commune, there is no doubt a deeper cause than the prevalence of anarchical social and religious theories. Such phenomena are strictly analogous to those of disease, indicating that sundry social functions are out of balance, and that the social organism is violently striving to regain equilibrium even at the risk of premature dissolution. Scientifically considered, the Commune was a case of retrograde metamorphosis, quite analogous to cancer in the individual organism; and it was due to a minor failure of adjustment incident upon a rapid change in the social environment. Increased wealth and a heightened standard of comfortable living, entailing prolonged labour and more intense brain-work, leave the least industrious and intelligent members of the community in misery little removed from starvation. And while under the unchecked operation of natural selection these unadapted members of the community would soon perish, as the lunatic and the drunkard would perish, we nevertheless save them artificially, as we artificially protect the drunkard and the lunatic; and we do so rightly, because the repression of our humanitarian feelings would entail far greater damage to society than the survival of these incapables. But in surviving they constitute a growth of a lower order of vitality, like a cancer implanted in nobler tissues, and their effort is to abolish a civilization of which their own misery is, for the time being, the inevitable result, and to reinstate that primitive order of things in which the strong fist and the strong passions were not yet at the mercy of the keen int[illegible] and [illegible]ge capacity for toil. Here, as in th[illegible] individual desires treated in the concluding chapter of Part II., we find a number of unadjusted cravings which natural selection can but imperfectly deal with, and which it must be left for some process of direct adaptation slowly to adjust. An analogous though not entirely similar explanation will apply to the case of Robespierre and the Terror.

But while such pathological phenomena can by no means be explained as solely due to certain anarchical theories social and religious, it still remains true that between the abnormal social phenomena and the anarchical theories there is a very close kinship; such that the theory finds itself practically incarnated in the social event, while it is through the anarchical theory that the abnormal social event finds itself redeemed from the odium attaching to sheer criminal malevolence, and entitled to that slight modicum of credit which we are wont to accord to sincerity when allied with destructive fanaticism. It is as true that the iconoclastic theory naturally lends itself to the purposes of the Jacobin or the Communist, as it is that the Jacobin or the Communist naturally justifies to himself his purposes by an appeal to the iconoclastic theory. Hence it is undeniable that when modern scientific thought, not yet having reached a dynamical view of things, allied itself to the spirit of mere negative protest against existing beliefs and institutions, it might well have seemed to a thinker like De Maistre to be irreconcilably hostile to all the habits and aspirations which give to civilized life its value.

Now the dynamical view of things, however crudely announced by Comte in his theory of the "Three Stages," differed widely from the statical view of De Maistre; for it proclaimed that we must found our general conception of the world and our plans for social amelioration upon a synthesis of special scientific truths, established by the use of the objective method, and not upon a congeries of theological dogmas, established originally by the use of the subjective method, and afterwards certified only by a perennial appeal to some authority assumed as infallible. It differed equally from the statical view represented by the iconoclasm of the eighteenth century: for it said, we cannot ignore the past, or treat it with contumely: the men who originated mythological explanations of natural phenomena were neither knaves nor the dupes of knaves, but genuine philosophers who made the best use of such implements of research as lay before them: men's conceptions of the world have been progressively stripped of their anthropomorphic vestments, and the scientific mode of thought, which, manifesting itself here and there in fragmentary generalizations, has all along been determining the progress, must ultimately, organized in a series of grand, all-embracing generalizations, reign supreme: the history of human thought is thus a development, and each creed or system, no matter how absurd it may at first appear, is a phase of that development; so that to construct a philosophy or a polity *de novo*, out of abstract principles, without reference to the concrete facts of past history, is simply to build a castle in the air.

Thus would Comte have answered on the one hand the Jacobins and on the other hand the Ultramontanes, with both of whom he has, by a strange but not inexplicable fate, been charged with owning fellowship. Thus we arrive at the philosophic explanation of the unparalleled range of his historic sympathies, of the generous recognition which he was ever ready to accord to the crude but needful and serviceable beliefs and institutions of earlier ages, and to their representative men of whatever creed. And thus, too, we are enabled to appreciate one of Comte's principal reasons for calling his system of philosophy "Positive." In sharp contrast with the *negative* philosophy of the atheists and Jacobins, its purpose was not to overthrow old beliefs by an assault from without, but to construct, upon the basis of the positive truths already furnish[illegible] science, a new system of beliefs, which should account for the old ones and supplant them by sheer force of its superior catholicity. For five centuries, said Comte, science has been arrayed in apparent hostility to religion, and philosophy has been chiefly employed in disintegrating Christian theology and feudalism: the time has now come for this negative work to be regarded only as incidental to the positive work of integrating scientific truths into a body of philosophic doctrine, upon which may ultimately rest a new theory of religion and a reorganized social polity.

As thus described, the critical attitude assumed by Positivism may appear to be identical with that which is the result of a thorough adherence to the Doctrine of Evolution. There is, however, a profound difference between the position of the evolutionist and that of the positivist, which it is well worth our while to characterize at some length, even at the risk of an apparent digression. Our subject is so very complex, by reason of the wide range of its practical applications, that we shall be greatly helped—as we have already on many occasions been helped—by contrasting our own view with that Comtean view which superficially resembles it. When we have noticed the two great errors—both of them due to imperfect apprehension of the nature of evolution, which left Comte, in spite of himself, in an attitude of hostility both to the current Christian theology and to the existing framework of society, we shall have virtually illustrated, with satisfactory clearness, our own conservative point of view.

In the chapter on Anthropomorphism and Cosmism the first of the two fatal errors of Positivism was elaborately described and criticized. It was shown that, although by his theory of the three stages Comte announced his philosophy as a continuous development from older theological philosophies, and although he declared himself determined not to break with the past, yet nevertheless his explicit ignoring of Deity constituted in itself a breach with the past which no

[illegible]

[illegible] the arguments which have formed [illegible] If there is any convincing power in the multitude of mutually harmonious proofs [illegible] accumulated, we must be already convinced that men are civilized, not by a mere change in their formulas of belief, but only by a change in their type of character which can be effected only through a considerable lapse of time. This is the reason why civilizations cannot be made, but must grow. We differ from the ancient Angles and Saxons, not so much because we know more than they knew, as because we have undergone fifteen centuries more of social discipline which has perceptibly modified our character, and with it our moral ideals. If Comte had ever firmly grasped the theorem "that society is to be reorganized only by the accumulated effects of habit upon character," he would have held himself aloof from projects which could have no meaning save on the hypothesis that society can be reorganized by philosophy. He would have seen that though the fruit of the tree of knowledge may make us like gods, knowing good and evil, it is only the tree of life which can renovate our souls and fit us for Paradise.

But now, since society grows, but is not made; since men cannot be *taught* a higher state of civilization, but can only be *bred* into it; it follows that the whole Comtean attempt to construct an ideal Polity, including a new religion and new social institutions, was—save as a warning for future thinkers—just so much labour thrown away. After all his profound and elaborate survey of human history, Comte strangely forgot that the sum-total of beliefs and institutions in the twentieth century will be the legitimate offspring of the sum-total of beliefs and institutions in the nineteenth, but can in no case be the offspring of an individual intellect, even were that intellect ten times more powerful than Comte's. No individual will has ever succeeded in remodelling society in conformity to a prescribed ideal. Perhaps no single man, if we except the Founder of Christianity, has ever made his individual character and genius count for so much in the subsequent direction of human events as Julius Cæsar. But Cæsar never reconstructed society, and, though not instructed in the Doctrine of Evolution, would have felt such a task to be simply an impossibility. The secret of Cæsar's greatness, and of his success, lay in the wondrous common-sense with which he perceived the true significance of contemporary events, and in the unflinching perseverance with which he wrought out the political system for which society was already yearning, and which the circumstances of the times rendered indispensable to the maintenance of civilization. This has been the secret of the success of all statesmen of the highest order; of Charles the Great and Hildebrand, as well as of William the Silent, Edward I. of England, Henry IV. of France, and Richelieu. By a sagacious instinct these great men felt, though they could not scientifically explain, the direction in which human affairs were naturally tending; and it was because they shaped their efforts with a view to assist, and not to check or warp, the resistless tendencies of society, that they succeeded in stamping their individualities so powerfully upon history. It is from the lack of this sagacity that the ablest retrograde statesmen have either failed utterly, or at best succeeded only in working wanton mischief. Julian, and Philip II. of Spain, occupied positions which enabled them to wield enormous power, and the former was a man of signal ability and undoubtedly good intentions. Yet Julian wholly failed to see that Platonic Paganism, however well adapted it may have been to the sporadic, municipal civilization of antiquity, was no longer adapted to the intellectual and moral needs of men living under the Roman Empire. Hence his insensate attempt to destroy the only religious organization capable of hol [illegible] iety t [illegible] ring the perilous times that wer [illegible] an [illegible] ich his early death fortunately [illegible] ore [illegible] persisted in long enough t [illegible] uce. Philip II., a man of medi [illegible] d [illegible] ar egoism, might y [illegible] do [illegible] co [illegible] been brought t [illegible] hich moving, and would move in spite of him. Yet he thought to establish in Romanized Europe an Oriental patriarchal despotism, and he thought by mere brute force to bring over half the civilized world to a religious system which it had for ever discarded. And thus, though he wielded a power such as no man for centuries had wielded before him, he achieved absolutely nothing. At the end of his evil career, he was farther from each of his cherished aims than at the beginning. The physical power of Spain was exhausted in the vain effort to stem the course of events, and all the credit the son of Charles V. ever earned was that of being one of the most mischievous among the enemies of the human race.

Now, our practical object in studying human progress scientifically is to be able to arrive at certain definite general principles of statesmanship. In every branch of speculative or practical activity, men begin by reasoning from particulars to particulars, accomplishing their results by a kind of sagacious instinct which hits upon the means requisite for attaining a given end. But after a while, as science progresses, they establish general principles of action, and work with a distinct consciousness of the adaptation of the means employed to the end proposed. From being instinctive and irregular, their proceedings become ratiocinative and systematic; witness the whole history of industrial art. And, as that history shows, the more intelligent and coherent the course of proceeding, the less is the time and effort wasted in vain experiment. It is just the same in politics. We need to understand the conditions essential to progress, and the direction which progress is taking, that we may avoid the mischief entailed by stupid and ignorant legislation, and [illegible]cure the benefits arising from legislation that is scientifi[illegible]lly conceived and put into operation with a distinct con[illegible]usness of th[illegible] to be secured. We need sociology [illegible] we may [illegible] our energies and damage society in opposing the very reforms which a little science might tell us that the community requires and will have, sooner or later, in spite of us. I do not mean to say that a knowledge of the laws of history will alone suffice to make us statesmen. Science and art are two different things, and so are scientific genius and practical genius. But if a Themistokles or a Hildebrand were to arise among us, he would be all the more useful for working in conformity to scientific principles, instead of trusting solely to his native sagacity. It is when genius works with vision that it achieves its utmost. And when we cannot have genius, by all means let us have vision, so far as science can impart it to us. Daily we grow indignant over the hand-to-mouth policy of our legislators, which inflicts so much needless suffering, and makes it so much harder for all of us to earn our bread. But we must remember that such a policy is the natural outcome of a foolish neglect of the lessons which history has to teach, and which may be read by anyone who holds the scientific clue to them.

Such is our practical object, and our sole practical object, in studying sociology as a science. To attempt to construct an ideal polity, by adopting which society is to remodel itself, is to show that we have studied that science to little purpose. For if history can teach us anything, it can teach us that civilization is a slow growth, of which no one can foresee, save in its most general features, the final result; far less force that result prematurely merely by appeals to men's judgment.

How utterly Comte ignored all this—the plain teaching both of historic induction, and of deduction from the laws of organic life—can be appreciated only when we read the insane pages in which he attempts to predict the immediate future. He by no means intended that society should wait till a remote era for the entire realization of his project. In seven years the control of public education in France was [illegible] be given to Comte. In twelve years the Emperor Napoleon was to resign in favour of a Comtist triumvirate. In thirty-three years the religion of Humanity was to be definitely established. As Mr. Mill says, "a man may be deemed happy, but scarcely modest, who had such boundless confidence in his own powers of foresight, and expected to complete a triumph of his own ideas on the reconstitution of society within the possible limits of his life-time. If he could live (he said) to the age of Fontenelle, or of Hobbes, or even of Voltaire, he should see all this realized, or as good as realized."

But what we have here to note is not especially the personal conceit of the project, or the marks of insanity clearly indicated in these inordinate expectations; what we have to note is the mode of genesis of this wild scheme. Extravagant beyond all comparison as Comte's proposals for remodelling religion and society undoubtedly were, they can nevertheless be easily traced, in their general outlines, back to the two errors which I have above signalized as the fundamental errors of Positivism. The first error—the ignoring of Deity—necessitated a complete rupture with Christian forms of religion; and the second error—the belief that society can be reorganized by a change in formulas of belief—led naturally to the attempt to substitute a new religion for Christianity and a new kind of civilization for the existing civilization. Thus in spite of his keen historic appreciation of the excellence of Christianity, and in spite of his sympathetic critical attitude, was Comte logically forced into a position quite as untenable as that held by the atheists and Jacobins. And now let us observe how, even as with these iconoclasts, the social state which Comte expected to substitute within forty years for the existing social state, was in all essential respects a retrogradation toward a more primitive structure of society. The positivist utopia is not indeed a return to in which human nature will have become so moulded by social discipline into fitness for the social state, that it will need little external restraint, but will be self-restrained; one in which the citizen will tolerate no interference with his freedom, save that which maintains the equal freedom of others; one in which the spontaneous cooperation which has developed our industrial system, and is now developing it with increased rapidity, will produce agencies for the discharge of nearly all social functions, and will leave to the primary governmental agency nothing beyond the function of maintaining those conditions to free action, which make such spontaneous cooperation possible; one in which individual life will thus be pushed to the greatest extent consistent with social life; and in which social life will have no other end than to maintain the completest sphere for individual life."[1]

If the scrutiny of these contrasted theorems still leaves us in any doubt as to the retrograde character of Comte's ideal society, a single practical illustration will more than suffice to convince us. We have seen that certain Jacobins of the Commune announced their intention to permit scientific research only to such persons as might succeed in convincing an examining-committee of average citizens that their researches were likely to be of direct practical value. I need not say that, if such a rule could be enforced, the intellectual advancement of mankind would be instantly arrested. It is interesting to observe that Comte entertained an intention not wholly dissimilar to this. Disgusted with the insatiable curiosity which leads scientific thinkers to pry into the secrets of nature in all directions at once, often spending years upon subjects which to self-complacent ignorance or Philistinism seem entirely trivial, Comte enacted that "some one problem should always be selected, the solution of which would be more important than any

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[1] Spencer, *Recent Discussions*, p. 123.

[illegible] humanity, and upon this the entire [illegible] the theoretic mind should be con- [illegible] resolved, or has to be given up as [illegible] mankind should go on to another, to [illegible] exclusiveness."[1] It only remains [illegible] problem was to be prescribed [illegible] When now, knowing as [illegible] certain kinds of inquiry, [illegible] have been the result could such [illegible] years ago; when we [illegible] been allowed to measure [illegible] in biology would [illegible] Mr. Darwin's researches [illegible] the correlation [illegible] undiscovered, that psy- [illegible] all that the new [illegible] existence, and that [illegible] have been heard of; when [illegible] thank God for the [illegible] impossible that the [illegible] be irrevocably [illegible] single speculative [illegible]

[illegible] would be [illegible] Comte's [illegible] possess neither [illegible] as throwing [illegible] mind, feeble [illegible] Whoever [illegible] expense of [illegible] all literature [illegible] has been said to exa- [illegible] with the past and seeking to [illegible] remodel religion and society artificially, Comte yielded to the inevitable necessity which compels the would-be reconstructor of society to remodel it ideally upon a lower type than that which actually exists. He would have given us a religion without God and a society without freedom of action.

If we now pause for a moment, and gather up the different threads of the argument, we shall assist the comprehension of our own position, presently to be stated. Let us, then, contemplate in a single view the conclusions deducible from the foregoing series of criticisms.

We have seen the old statical habit of thought, as represented in the Doctrine of Creation, manifesting itself in rigid orthodoxy, both in religion and in politics. We have observed the way in which modern scientific inquiry, detecting numberless absurdities or anomalies in the religious and political orthodoxy inherited from mediæval times, yet retaining and carrying into its criticisms the statical habit of thought, has assumed an iconoclastic attitude with reference to the existing order of things. We have traced this iconoclastic attitude in the modern history of Atheism and Jacobinism, and have noted how its tendency is in the direction of social dissolution. We have found that the only possible result of a sudden and violent alteration of the existing order of things must be a retrogradation toward some lower order of things, characteristic of some less advanced type of civilization. And of this fatal necessity we have seen the most instructive example in the career of the Positive Philosophy. Though it had partially compassed, in an empirical fashion, the notion of development; though it was fully alive to the barrenness of iconoclastic methods; though it began by regarding itself as the normal product of a long course of speculative evolution;—nevertheless when, by its ignoring of Deity, Positivism found itself arrayed in sheer opposition to established and time-honoured theories, [illegible] retrogradation was hardly less marked than it had been in the case of atheistic Jacobinism. And when the notion (born of the statical habit of thought), that men's natural ways of thinking and acting can be suddenly changed by a change in philosophic formulas, was called to its aid, the result was that absurdest though most logically constructed of all utopias, the Positive Polity.

In view of these profoundly interesting and instructive conclusions, can we not, by sheer contrast, immediately discern what must be the critical attitude of any philosophy which is based upon the thorough and consistent recognition of the Doctrine of Evolution? We too, as well as the Positivists, have our ideal state of society,—a state well described in the passage above quoted from Mr. Spencer, in which the greatest possible fulness of life shall be ensured to each member of the community by the circumstance that in the long course of social equilibration the desires of each individual shall have become slowly moulded into harmony with the coexistent desires of neighbouring individuals. But as cataclysms and miracles and sudden creations have no place in our purely dynamical theory of things, we do not expect to see this ultimate state of society realized within half a century. We know full well that it can be realized only in the indefinitely remote future. Nay, since the conception of absolute finality is as inconsistent with the Doctrine of Evolution as is the conception of absolute beginning, we do not regard it as destined ever to be absolutely realized. That supreme epoch of social equilibrium in which every man shall love the Lord with all his heart and his neighbour even as himself, in which the beast shall have been worked out, and, in Tennyson's phrase, the ar and the tiger shall have been allowed to die within us, which egoistic or anti-social impulses shall be self-res ained, and everyone shall spontaneously do that which tend towards the general happiness,—this supreme epoch is tely for ever to remain an ideal epoch which shall relativ tinctly realized without ever being realized absolutely, just as the hyperbola for ever approaches its asymptote without coming in contact with it. There will always be room left for that aspiration after a yet higher fulness of life, after a "closer walk with God," which, whether it be expressed by the symbols of science or by the symbols of mythology, is the indestructible essence of all religion. An absolutely perfect state of society would be, by a curious and instructive paradox, a state in which the religious sense would have no further function to subserve, because goodness would have become automatic and aspiration would be at an end.

But while our ideal state of society is one which can only be gradually, relatively, and approximatively realized, it has none the less a present existence as an ideal which we must ever strive to incarnate as far as possible in the concrete facts which make up the sum of our every-day life. There is a practical sense in which the evolutionist, no less than the radical sceptic or the orthodox believer, must recognize that he has a missionary function to fulfil. We do indeed aim, in conformity with surrounding conditions, at the realization of our social and ethical ideal,—seeking to do what within us lies to hasten the time when it may be proclaimed, with fresh significance, that the kingdom of heaven is at hand. But how shall we seek to effect our purpose? Shall we go forth to all the world and preach some "gospel of Evolution," in the hope that men, seeing the error of their ways, shall suddenly embrace the new faith and be henceforth spiritually healed? In two ways our philosophy has taught us the absurdity of such a proceeding. *First*, such doctrines are too subtle, too spiritual indeed, to be apprehended otherwise than by a slow process of growth, intellectual and moral. Accordingly, since men's theologies are narrowly implicated with their principles of action, the taking away [illegible] th [illegible] other process than that of slowly supplanting it by a new system of conceptions equally adapted to furnish general principles of action, would be to leave men trivial-minded and irreligious, with no rational motive but self-interest, no clearly-conceived end save the pleasure of the moment. The evolutionist, therefore, believing that faith in some controlling ideal is essential to right living, and that even an unscientific faith is infinitely better than aimless scepticism, does not go about pointing out to the orthodox the inconsistencies which he discerns in their system of beliefs. And while assured that the deanthropomorphizing process will continue to go on as it has gone on since the dawn of history, under the slow but unceasing stimulus of scientific generalization, he at the same time rejoices that a violent destruction of anthropomorphic conceptions is impossible. Refraining, therefore, from barren theologic controversy, his aim is to carry scientific methods and scientific interpretations into all departments of inquiry, in accordance with the profound aphorism of Dr. Newman: "False ideas may be refuted by argument, but only by true ideas can they be expelled." Have we not seen that our beliefs are in a measure wrought into the very substance of our brains, so that the process of eradicating them *must* be a process of substitution which, as involving structural changes, must needs be gradual?

But *secondly*, the evolutionist must recognize that, even were it possible to effect a sudden conversion of mankind to a faith based upon scientific knowledge, such a conversion would not bring about the desired result of inaugurating a higher and better state of society. Not by a change of opinion, but by a change of heart, is the grand desideratum to be obtained. It is not by accepting all the theorems comprised in the Doctrine of Evolution, or in any other doctrine whatever, that men are to obey the dictates of selfishness less and the dictates of sympathy more. Yet *this* is the transfer of allegiance upon which, as we have elsewhere shown, the amelioration of society and the relief of man's estate depend.

And these considerations as to the critical attitude of the evolutionist with reference to theology will equally apply to his critical attitude with reference to politics, concerning which I need, therefore, add but few explanatory words. Since it is the plain teaching of history that the group of institutions making up the framework of society at any given period cannot be violently altered without entailing a partial disintegration of society; since any custom or observance can be safely discontinued only when the community has grown to the perception of its uselessness or absurdity; and, above all, since the integrity of society depends in an ultimate analysis, not upon its institutions (which may be as liberal in Mexico as in Massachusetts), but upon the integrity of its individual members; it follows that the evolutionist will look askance at the panaceas of radical world-menders, refusing to believe that the millennium can be coaxed or cheated into existence until men have learned, one and all, each for himself, to live rightly. The only utopian ideal which he can consistently cherish, is that of contributing his individual share of effort to the improvement of mankind by leading an upright life, and applying the principles of common-sense and of the highest ethics within his ken to whatever political and social questions may directly concern him as member of a progressive community.

When, therefore, we are asked how we shall seek to incarnate in fact our ethical and social ideal, the reply is: we must seek to realize this ideal, in so far as our frail half-developed natures will allow, by leading pure and upright lives, repressing the selfish impulses which are our legacy from the brute, obeying the dictates of sympathy whereby we are chiefly distinguished as human, and conforming as well as we may to the highest ethical code within our ken.

As the coral reef is built by millions of tiny polyps, each giving up his little life to the process, until a stately island arises in mid-ocean, so the ideal society of the future, with its exemption from the ills which we now suffer, will be the result of myriads of individual efforts towards greater completeness of life. Every temptation that is resisted, every sympathetic impulse that is discreetly yielded to, every noble aspiration that is encouraged, every sinful thought that is repressed, every bitter word that is withheld, adds its little item to the impetus of the great movement which is bearing Humanity onwards toward a richer life and a higher character. Out of individual rectitude comes the rectitude and happiness of the community; so that the ultimate salvation of mankind is to be wrought out solely by obedience to that religious instinct which, as shown in the preceding chapter, urges the individual, irrespective of utilitarian considerations, to live in conformity to nature's requirements. "Nearer, my God, to thee," is the prayer, dictated by the religious faith of past ages, to which the deepest scientific analysis of the future may add new meanings, but of which it can never impair the primary significance.

Thus with regard to its practical bearings upon human conduct, the religious attitude of our scientific philosophy seems to be absolutely identical with the religious attitude of Christianity. We arrive at a deeper reason than has hitherto been disclosed for the difference between our position with reference to Christianity, and that which has been assumed by Radicalism and by Positivism. It is not merely that we refuse to attack Christianity because we recognize its necessary adaptation to a certain stage of culture, not yet passed by the average minds of the community; it is that we still regard Christianity as, in the deepest sense, our own religion. Or, if a somewhat different form of statement be preferred, we regard it as a faith which, precisely in the act of realizing more and more fully its own ideal, becomes more and more fully identified with the faith which we are conscious of cherishing. Instead of the intolerant hostility of the Infidel, or the indifferent neutrality of the Positivist, we offer cordial aid and sympathy. I cannot better illustrate the twofold source of this sympathy than by citing the words of a lady who is fairly entitled to rank as one of the most original and suggestive thinkers of our time. Speaking of the lower of the two lines of thought which determine the critical attitude of the evolutionist, Miss Hennell says:—"When we see the various modes of error in belief, no longer in the light of heresies that we have the right to punish, or even to despise, but only as the incomplete condition that must of necessity belong to that which has to ripen out of the lower state into the higher; and when we bethink ourselves that it is the matter of our own most cherished aspiration that our own condition, as presently occupied, has to appear in the very same light to the station to be attained hereafter; charity towards the imperfection is so inevitable that indeed it no longer requires to be insisted on as if it required inculcation. Our sphere of religious sympathy has been so much enlarged beyond its former bounds, that the original matter of duty has become matter of simple unquestioning feeling." Now this admirably illustrates what I have called the lower of the two lines of thought which determine our position: it explains our refusal to attack Christianity. The following deeply-meditated passage illustrates the higher line of thought, and shows why we identify our position with that which is held by Christianity. "Very slight ground of self-gratulation should I have found," says Miss Hennell, "in even the most palpable superiority of present faith that might have been gained, if the acquisition had really been made, as at first it appeared to me to be made, and as it must still appear to orthodox believers to be made, at the expense of the absolute subversal and denial of the faith that had gone before it. If I could not now perceive that what was once true to me, and true to the world, was true for ever, in relation to what had to come after it, I do not deny to myself that I should inevitably fall away to cease believing at all henceforth both in myself and in the world. Yes: if I could not see in relation to Christianity, just as truly as was seen by the master-spirits of that religion in relation to Judaism, that neither of this later form of realization 'can one jot or tittle pass away, until all be fulfilled' in the newly-arriving doctrines of General Religion,—never, I am convinced, could the latter take any real hold upon me: never, in fact, could it *be* a religion to me."[1]

To those who still adhere to the sharp distinctions characteristic of the statical view of things, who carry into their estimate of religious opinions the conception of fixity of species, it may seem absurd or sophistical in us to assimilate with Christianity a system of thought which has entirely thrown off the mythologic symbols wherein Christianity has hitherto been clothed and whereby it is customarily recognized as possessing an individuality of its own. To such it naturally seems that the giving up of the symbol is the giving up of the reality, and that the critical attitude of him who has given up the symbol must be an attitude of radical hostility. But now, as the crowning result of the whole argument, we are enabled to show how the dynamical view of things disposes of this paradox. He who brings to his estimate of religious opinions a Darwinian habit of mind, must understand that a sudden and radical alteration of Christianity into something else is as impossible as the sudden and radical change of one type of organism into another. He will see that, while form after form has perished, the Life remains, incarnated in newer and higher forms. That which is fundamental in Christianity is not the mythologic superstratum, but the underlying spiritual principle. The mythologic symbols have changed from age to age. The constant element has been, on its intellectual side the recognition of Deity, and on its emotional side the yearning for closer union with Deity, or for a more complete spiritual life. And the three foregoing chapters have conclusively proved that this constant element, in both its aspects, remains unchanged in that religion whose symbols are shaped by science.

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[1] Miss Hennell, *Present Religion*, pp. 50, 51.

In using the phrase "Cosmic Theism," therefore, to denote the religious phase of the philosophy based upon the Doctrine of Evolution, I do not use it as descriptive of a new form of religion before which Christianity is gradually to disappear. I use it as descriptive of that less-anthropomorphic phase of religious theory into which the present more-anthropomorphic phase is likely to be slowly metamorphosed. The conflict, as it presents itself to my mind, is not between Christianity and any other embodiment of religion or irreligion. The conflict is between science and mythology, between Cosmism and Anthropomorphism. The result is, not the destruction of religion, but the substitution of a relatively adequate for a relatively inadequate set of symbols. In the scientific philosopher there may be as much of the real essence of Christianity as there was in the cloistered monk who preceded him; but he thinks in the language of a man and not in the language of a child.

The critical attitude of our philosophy with reference to the beliefs and the institutions amid which we live, has now been quite thoroughly defined both by what it is and by what it is not. We may now, I think, safely affirm that when Mr. Mivart accuses the Doctrine of Evolution of tending toward the intellectual and moral degradation of mankind and toward the genesis of atrocities worse than those of the Parisian Commune, he clearly shows that he has not thoroughly comprehended the implications of the doctrine. The conception of evolution, which he adopts after a loose and inconsistent fashion in so far as his own special studies have constrained him to adopt it, remains nevertheless in his mind a barren conception. He quite fails to grasp the dynamical view of things, and therefore naturally regards the overthrow of Roman Catholic theology as equivalent to the inauguration of atheism and of anarchy. We have seen, on the other hand, that all the iconoclastic attacks which have been directed either against Christianity or against the existing order of society have been theoretically based upon fallacies which are incompatible with the Doctrine of Evolution. It has been shown that, upon our general theory of life, we can look for the realization of our highest social ideal, only in the perfecting of individual character under the conditions at any time existing. And for the perfecting of individual character we must rely upon that increasing sense of divine omnipresence and that increasing aspiration after completeness of spiritual life, which, taken together, constitute the permanent element in Christianity. When we add that our ethical code, deduced theoretically from the conception of Life set forth at such length in the second part of this work, is at bottom identical with the ethical code sanctioned by the highest Christianity, it at last becomes apparent how truly conservative, in the best sense of the word, is the critical attitude of our philosophy.

The iconoclast, who has the welfare of mankind nearest his heart, will indeed probably blame us as too conservative, —as lacking in robust and wholesome aggressiveness. And he will perhaps find fault with us for respecting prejudices which he thinks ought to be shocked. Our reply must be, that it is not by wounding prejudices that the cause of truth is most efficiently served. Men do not give up their false or inadequate beliefs by hearing them scoffed at or harshly criticized: they give them up only when they have been taught truths with which the false or inadequate beliefs are incompatible. The object of the scientific philosopher, therefore, will be to organize science and extend the boundaries of knowledge.

If he obtains a fresh morsel of truth, he will proclaim it to the world without dread of consequences, and let it bide its time until society comes, of its own free-will and intelligence, to accept it. But while feeling it unnecessary, and often unadvisable, to urge his views upon others, no craven fear of obloquy will prevail upon him to conceal them when it is desirable that they should be stated. He will state them without mental reservation, and, above all, without fear of any possible harm that can come from the unhampered quest of truth. There is nothing more reprehensible than the secret dread of ugly consequences with which so many writers approach all questions of vital importance. They shrink from lifting the veil which envelopes the Isis-statue of Truth, lest instead of a beaming countenance they may perchance encounter a ghastly death's head. But philosophy should harbour neither fears nor repugnances, nor qualms of conscience. It is not for us, creatures of a day that we are, and seeing but a little way into a limited portion of nature, to say dictatorially, before patient examination, that we will not have this or that doctrine as part of our philosophic creed. We must feel our way as best we can, gather with unremitting toil what facts lie within our reach, and gratefully accept such conclusions as can honestly and by due process of inference and verification be obtained for our guidance. We are not the autocrats, but the servants and interpreters of Nature; and we must interpret her as she is,—not as we would like her to be. That harmony which we hope eventually to see established between our knowledge and our aspirations is not to be realized by the timidity which shrinks from logically following out either of two apparently conflicting lines of thought—as in the question of matter and spirit—but by the fearlessness which pushes each to its inevitable conclusion. Only when this is recognized will the long and mistaken warfare between Science and Religion be exchanged for an intelligent and enduring alliance. Only then will the two knights of the fable finally throw down their weapons, on discovering that the causes for which they have so long been waging battle are in reality one and the same eternal cause,—the cause of truth, of goodness, and of beauty; "the glory of God, and the relief of man's estate."

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